The Iron Age

A Review of the Hardware and Metal Trades.

Published every Thursday Morning by DAVID WILLIAMS, No. 80 Beekman Street, New York.

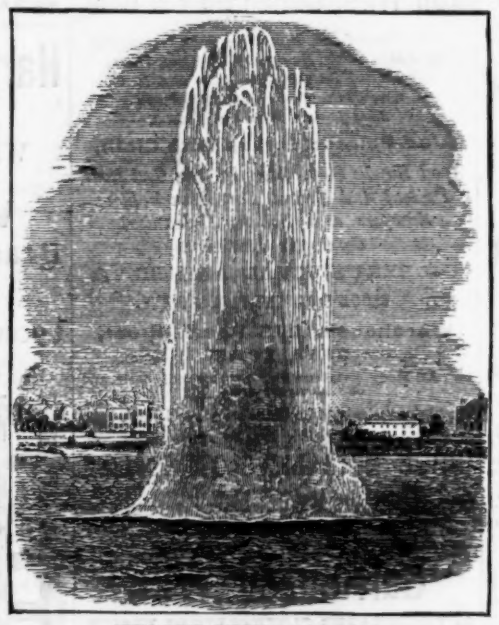
Vol. XI: No. 6. *New York, Thursday, February 6, 1873.* *Four Dollars a Year. Single Copies, Ten Cents.*

The 25 Ton Gun of the "Hotspur."

The accompanying illustrations show the great 25 ton gun of the British iron-clad "Hotspur," carrying a 600 lb. projectile, and a section of the "Glatton's" turret, showing the effects of a shot from the "Hotspur" during the target practice off Portland, described in these columns last August. As will be seen from a careful examination of the illustration, the gun can, by very simple and compact machinery, be readily moved longitudinally, transversely, and vertically, or transported from side to side. And, far more difficult of attainment, motion can be instantly arrested or prevented in any of these several directions, notwithstanding the heave of the sea, the movements of the ship, or the force of the discharge. The expanded view, or elevation, given of the "Glatton's" turret supposes the circumference to be laid on a plane, and shows the displacement of the armor-plate, joints, etc., as visible outside; and, in dotted lines, the fracture in the lining-plate and displacement of the vertical frame, with position of some other frames in the interior. A armor-plates, 14 inches thick, in front of turret; A' armor, 12 inches thick, elsewhere; B C vertical and horizontal wooden backing, 9 inches and 8 inches thick respectively; D two inner-skin plates, each ⅝-inch iron; E horizontal girders in backing; F vertical frames of turret wall; G inner lining-plates, ⅜-inch thick; H roof-plates; J roof-beams; K shelf-plate beneath armor, ⅝-inch thick; L brackets to support shelf-plate; M a stiffening ribbon of ⅝-inch plate; N gutter; O glacis (or deck) plate 3½ inches at thickest part.

TORPEDO EXPERIMENTS, WESTON-SUPER-MARE.

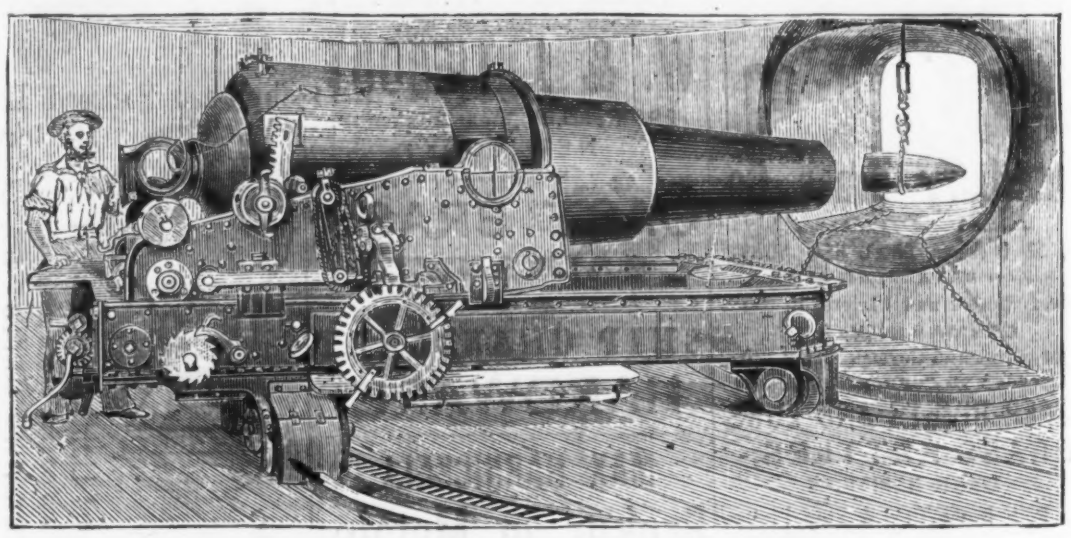
The object of the experiments, which took place last month, and which were conducted by the Torpedo Committee and Gun-cotton Committee conjointly, was to obtain data with reference to the comparative power of gunpowder, picric powder, and compressed gun cotton, when exploded under the same conditions, and also to ascertain the depth of water at which a charge of 100 lbs. of each of these explosive agents would produce the greatest lateral effect. The torpedoes, which had previously been laid in different parts of the bay, were connected by means of a cable with the Knight-stone Pier, where a galvanic battery was placed. The several charges were fired by electricity, viz., by connecting the shore end of the cable with the galvanic apparatus—the explosion being instantaneous.



SUBMARINE TORPEDO EXPLOSION.

One of the principal results of these experiments has been the important discovery of the detonation of wet gun-cotton. It is found that it can be exploded in a wet state, the charge fired on Dec. 4 being not only saturated with water, but the interstices between the discs in the case were also filled with similar non-explosive liquid—in short, the whole 125 lbs. of gun-cotton may be said absolutely to have been floating in water at the time it was fired. This discovery is due to Mr. E. O. Brown. Nitrated gun-cotton is an admixture of ordinary gun-cotton with saltpetre; the picric powder is an explosive formed by the admixture of picrate of ammonia and saltpetre, in the proportion of 4 to 3 by weight, is manufactured in a similar manner to gunpowder, and is very much like coarse mustard in appearance. Both these last-named explosives are the discoveries of Mr. Abel.

The result of the experiments may be briefly summarized as follows: Under the conditions tried nitrated gun-cotton is slightly more powerful than ordinary gun-cotton; picric powder is very nearly, if not quite, equal to dry gun-cotton in explosive power; both are far superior to gun-powder; damp or saturated gun-cotton can be exploded by means of a detonating fuse, with but little loss of power, as compared to dry gun-cotton; the description of case, *i. e.*, whether strong, as of iron, or weak, as an india-rubber bag, is immaterial in the case of gun-cotton, but with picric powder the same must be charged in a water-tight case. The charges fired in 10 ft. of water threw a column considerably higher than those laid in a greater depth of water; in other words, as the depth of water decreases the column of water thrown up vertically increases, but with this increase the lateral explosions decrease. The largest crater made was on December 4, by a charge of picric powder fired under 13½ ft. of water, when the admeasurement from the lip to the base was 9 ft. 6 in., and the diameter 20 ft. The explosion represented in our sketch, which is from a photograph by F. R. Elwell, Esq., M. A., was caused by 100 lbs. of picric powder fired under 12¼ ft. of water. The highest column of water was thrown on December 3, by a charge of gun-cotton, the hight of the column being roughly estimated at 160 ft., and containing upward of 2000 tons of water. The experiments are considered by the authorities to be an entire success, the same being in a great measure due to the correct working out, by Lieuts. Hall and Watson, of most intricate calculations.

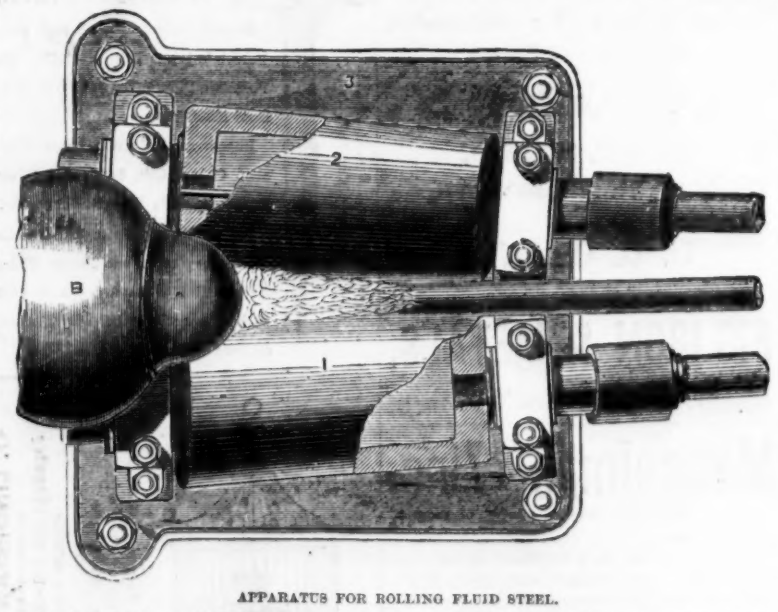


THE 25 TON GUN OF THE BRITISH IRON CLAD "HOTSPUR."

Rolling Fluid Steel.

We take the following from *The Engineer*:

The possibility of producing a bar of steel of, practically speaking, an unlimited length, is a problem which, so far as we know, has not yet been solved, but in what he calls the second part of his invention, Mr. James Robertson, of Glasgow, makes, as will be seen from our illustration, a step at least in this direction. We give a plan view of the apparatus. In the process proposed, conical obliquely set rolls are used, with a close-fitting end piece at the wide or entering end of the rolls, having its bottom extending along between them, so as to form a cavity, with the rolls for its sides. Into this cavity molten steel is poured from a melting pot, a furnace, or Bessemer converter, and after the steel being allowed partially to cool and become viscid at the delivery end, the rolls are made to revolve and turn round the mass of steel between them, gradually compressing its greater diameter at the entering end into the smaller diameter of their delivery end, and then screwing out the steel in a cylindrical bar. For very long bars, whilst the rolls are discharging the steel from between them in a bar at the delivery end, the molten steel is caused to flow continuously, or intermittently into the cavity at the entering end. From this arrangement, from the greater mass and the constant or intermittent supply, the steel at the entering end is in a fluid or semi-fluid state, whilst the slow delivering action of the rolls allows it to become partially cooled, so as to be sufficiently solidified to retain the cylindrical bar shape given to it as it leaves them. It will be observed that in this case the rolls 1, 2, are smooth, and that the close fitting anvil piece 5, fixed to the sole plate 3, is made with a cavity for the passage through it of a stream of water to keep it from being injured by the great heat of the fluid metal, and that for a like reason the rolls 1 and 2 are r low and water passed through them. dent that the question of the speed the rolls are actuated is, looking at character of the matter to be oper driven by a special steam engine giving complete control over the speed of the rolls, so that the attendant might be able, either by regulating the flow of steel into the space between the rolls, or the speed of delivery, to retain the enclosed mass of metal at a suitable temperature for uniting with the onward flow thereof from the Bessemer vessel, and also for delivering it in the form of a box at the discharging end. He also proposes other arrangements for cooling the rolls and anvil internally, whilst sprays or jets of water can be made to play on them externally, and the cavity between the rolls be partially lined with clay or loam to enable it to withstand the great heat. Looking at this portion of Mr. Robertson's patent, we are inclined to think that his great difficulty will really be what he attempts to defend himself from by these last-named provisions, and that it is the intense heat at which the steel in a fluid state must be received which will give him most trouble. Taking this initially at 3000 deg., we are much inclined to doubt whether it will be possible by any means to keep moving machinery in contact with a body at such a temperature sufficiently cool to prevent warping or partial destruction of the parts, and consequent disarrangement of the necessary mechanical action for the treatment and conversion of the liquid steel into bars. This difficulty overcome, and experiment alone can demonstrate the feasibility of so doing, we are prepared to give it as our opinion that Mr. Robertson will be able to produce steel bars of practically unlimited length—a fact which, when accomplished, must have in its different bearings no small influence on steel manufacture, and one well worthy the attention of the constructing engineers of the present day.

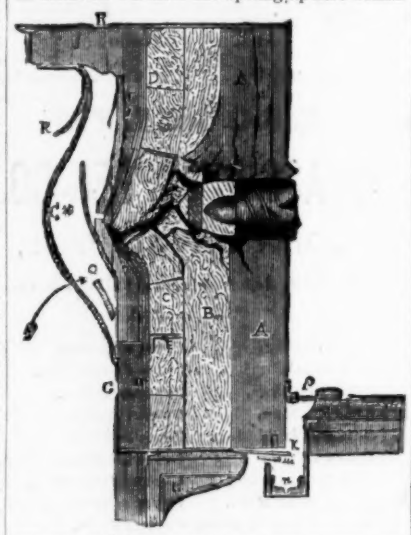


APPARATUS FOR ROLLING FLUID STEEL.

The St. Anthony's Falls Tunnel.

A correspondent, writing from Minneapolis, Minn., says:

The citizens of Minneapolis, in common with those of our neighbors of St. Anthony, on the bank of the river, of St. Paul, some eight les below us, and indeed of the whole State Minnesota, are, and have for a long time, een peculiarly interested in the great work of unnelling the Mississippi River at this point, and the possibility of its considerably varying temperature, a most important one, and the patentee declares that the driving gear of the rolls should be so constructed as to give readily any required increase or decrease of motion, so that they might probably more advantageously be situated the first of the series of falls which occur in ascending the river, the Mississippi having at this point a perpendicular fall of eighteen feet. This fall furnishes an unlimited water-power, and is the main cause of the rapid progress of the cluster of towns within a radius of twelve miles of it. The presence of the falls, with its impetuous, rushing flow of water, does away entirely with the need of steam for manufacturing purposes, and, as a consequence, an immense business has sprung up here within as a means of securing the preservation of St. Anthony, upon which depends so much of the prosperity of the three cities. As your readers are probably aware, Minneapolis is built at the head of navigation of the Mississippi River, and about 2080 miles from its mouth. Here is



EFFECT OF 600 LB. SHOT UPON THE TURRET OF THE "GLATTON."

the past five or ten years in saw-mills, flour mills, and other manufactories.

Long ago it became evident that the sandstone over which the water descends, producing the falls, was crumbling away. This process of disintegration has been going on for centuries, probably, and it was easy to perceive that it was but a question of time for the river to find its level with the final wearing away of the rocks. This result would be fatal to the prosperity of the two cities, or, at all events, would seriously cripple them in the race of progress. Attention was therefore directed to the best plan of securing the falls, and it was finally determined that the proper method to be adopted was to construct a tunnel across the river on a line with the falls. This work has now been in progress for several months, and is still going steadily forward under the general supervision of Major Benyard, of the United States Engineer Corps, and the immediate control of Mr. J. T. Stevens. At present about 100 men are engaged upon the tunnel, which has been thoroughly "lined" for a good portion of its extent. A very important adjunct to the work has been recently completed in the shape of a great bulkhead beneath the surface of the ground at the head of Hennepin Island, the purpose of which is to completely and effectually shut out the water from the tunnel below whenever desired. This bulkhead is composed of solid masonry laid up in hydraulic cement, and is of immense resisting power. Its dimensions are: hight, 16 feet; length, 80 feet; and thickness, 28 feet. Two sluices run through this bulwark which are designed to carry off the leakage while work is in progress above it. These sluices can be closed at any time by heavy wrought-iron gates, so arranged that they can be shut from the surface. Narrow chambers, which will be immediately filled up with solid masonry-work, have been cut through the sand rock immediately above the bulkhead, with the view of determining if there were any veins in the rock leaking water, and which might prove injurious if unattended to. The result of the investigation showed not only that there were no leakages, but that, contrary to the accepted belief, water does not ooze through the sandstone at all. The engineers engaged upon the task of securing the falls have every confidence in the tunnel plan as being the true and proper method of obtaining the desired result.

New Iron Steamers.

The new steamship Mosel, belonging to the North German Lloyd Company, is now lying at her dock in Hoboken, having accomplished her initial passage across the Atlantic in the short space of 12 days and six hours. The Mosel is a larger boat than the other vessels in the line, and was built by Messrs. Caird & Co., at Greenock, on the Clyde. She is an iron propeller and her dimensions are: Length, 365 feet; beam, 40 feet; depth of hold, 35 feet. She has a flush hurricane deck; her gross tonnage is 3500, and her bunkers carry 1000 tons of coal. She is full brig rigged, carries eight metallic lifeboats and two gigs, and her decks are of East India teak. Her machinery is powerful and fine, being inverted direct-acting engines of 400 horse-power nominal, with the capacity of working up to 2500. She has two cylinders, 72 inches in diameter, with 5 feet stroke; has surface condensers, and is furnished with all the latest mechanical improvements, her starting gear being worked by steam. The boilers are six in number, with four furnaces to each; the shafts are of steel and 16½ inches in diameter. Her screw or fan has four blades, is 17 feet 6 inches in diameter and has 30 feet pitch. During the passage her machinery worked smoothly and well, despite the severe weather encountered. The crew is composed of 14 officers and 95 subordinates. The saloons of the Mosel are splendidly furnished, the panels being of highly polished maple, with mouldings of rosewood and black walnut, and the pilasters and cornices richly gilded. Fine oil paintings of scenery on the Mosel, an elegant piano and library also adorn the main saloon, while the one devoted to the ladies and also the smoking room is beautifully fitted up. The berths have everything requisite to promote the comfort of passengers. The vessel is heated with steam throughout, and the second cabins, which are between the main and lower deck, can be ventilated by a new and unique process. The Mosel can accommodate 90 first-class, 126 second-class and 680 steerage passengers. Pneumatic bells are attached to all the rooms. The pantries and galleys are marvels of cleanliness and order; her ice house holds 40 tons and her water tanks 16,000 gallons.

The new British steamship Surprise, belonging to the China line of E. De Bussche, arrived from Shanghae, having come via the Suez Canal. She is an iron vessel of 1233 tons, is 288 feet in length, 34 feet beam, 23 feet depth of hold and 21 feet draft. She has three decks, five water-tight bulkheads and is fitted with machinery of the finest make and material. She was built at Renfrew, and is commanded by Captain Shaw. She left Shanghae on October 1, Amoy, November 10; Singapore, November 20; Point de Galle, November 30; Suez, December 16; Port Said, December 18; and Gibraltar, January 3.

Another Rolling Mill Burned.—We learn by telegram that the mill and four buildings of the Lake Erie Iron Co's Rolling Mill were destroyed by fire on Sunday last. The warehouse and office were saved. The fire originated in the engine room. It is understood that the loss, though heavy, is fully covered by insurance and that the works are to be rebuilt immediately.

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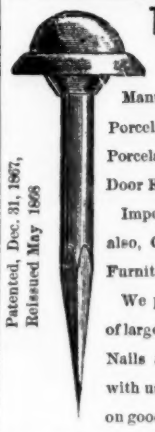

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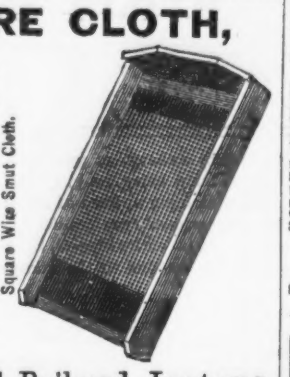

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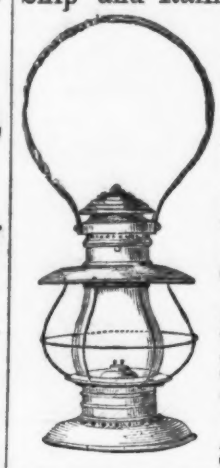

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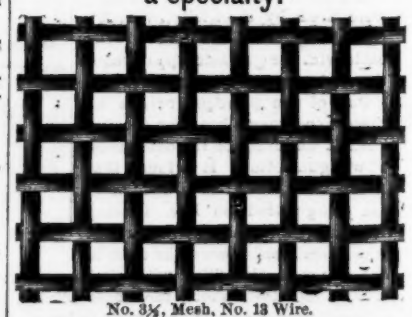

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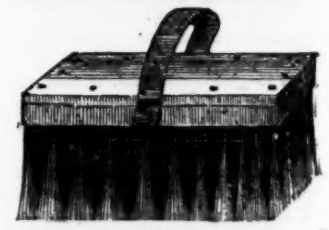

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New Patents.

We take from the records of the patent office at Washington the following specifications of certain patents lately issued, which will be found interesting:

IMPROVEMENT IN REDUCING LEAD ORES AND COLLECTING PRECIOUS METALS.

Specification forming part of Letters Patent No. 134,457, dated December 31, 1872, issued to James V. Z. Blaney and Richard F. Adams, of Chicago, Illinois.

The object of this invention is to work the galena or lead ores which contain gold or silver, etc., and the pyrites or sulphurets of copper or iron which may or may not contain the precious metals, or the baser metals, such as copper, etc., in a cheap and economical manner, so as to obtain the several metals—gold, silver, copper, or other metals—in the lead regulus, from which condition it is easily separated by processes well known to the art.

It consists in a process wherein the galena and its admixtures, together with the pyrites which have been previously roasted to reduce them to the state of a sponge or oxide, are fused by the presence of an alkali, salt of an alkali, or alkaline earth with carbon, which will take up any remaining sulphur, so that the lead contained carries down with it the precious and base metals.

The following are approximate proportions of materials to be used for the reduction of argentiferous galena and auriferous pyritous ores: To 500 pounds of galena and 500 pounds of desulphurized or roasted pyrites add from 50 to 75 pounds of coke or charcoal for carbon, and from 300 to 500 pounds of an alkali, such as soda-ash, or an alkaline earth, such as limestone or quicklime, or a mixture thereof, as soda-ash, one part, to lime, two parts.

Approximate proportions of materials to be used for the reduction of galena and other ores not containing any considerable quantity of iron: To 1000 pounds of ore add from 200 to 250 pounds of peroxide or other compounds of iron, and from 50 to 75 pounds of coke or charcoal for carbon, and from 300 to 500 pounds of an alkali, such as soda-ash, or an alkaline earth, as limestone or quicklime, or a mixture thereof, as soda-ash, one part, to lime, two parts.

These proportions may be for the different ores to be reduced. In roasting pyritous ores the greater proportion of the sulphur is driven off, and oxygen enters into combination; hence a large proportion of the sulphide of iron is converted into magnetic or peroxide of iron, furnishing the oxide of iron prescribed for the flux.

In smelting the ores containing little or no oxides of iron, the oxides of iron must be added to the flux. In the smelting of the ores in the furnace the oxides of iron, whether furnished by the roasted pyrites or not, together with the carbon and the alkali, or alkaline earth, or mixture thereof, reduce any sulphides of the various metals present in the ores, such as lead, gold, silver, copper, etc., to the metallic state, the lead furnished by the galena acting as a medium to collect and carry down the gold, silver, and other metals in both ores, whether they exist in the ores as sulphides or in the metallic state. The carbon removes the oxygen from the iron oxides, leaving metallic iron in a minutely divided state to remove the sulphur. The soda-ash or soda-lime mixture doubtless removes some sulphur also, and combines with the silica, alumina, and other substances of the gangue, with any remaining iron that there may be, to form a fusible slag, permitting the reduced metals to settle to the bottom.

Claim 1. The reduction of galena containing gold, silver, etc., together with pyrites which may or may not contain precious or base metals, in the presence of an alkali, salt of an alkali, or alkaline earth and carbon, substantially as described.

2. The process of simultaneously reducing galena containing gold, silver, &c., and pyritous ores (after roasting), with carbon, and in the presence of an alkali, salt of an alkali, or an alkaline earth, whereby the roasted pyrites furnish the oxides of iron necessary to reduce, and the galena the lead necessary to carry down, the precious and base metals in both ores, substantially as specified.

IMPROVEMENT IN BESSEMER-STEEL-CONVERTER BOTTOMS.

Specification forming part of Letters Patent No. 133,938, dated December 17, 1872, issued to Mr. A. L. Holley, of Brooklyn, New York.

Figure 1 is a section on the line A B of Fig. 2; and Fig. 2 is a plan of a tuyere-box C of a Bessemer converter, and of the tuyeres D D, and of a part of the refractory material between the tuyeres, and of the mold P in which the refractory material is rammed up. The tuyeres and the refractory material form, and, for the purposes of this specification, are called, the "bottom" of the converter.

There are usually several duplicate bottoms, so that when one is worn away by use, another previously rammed up and dried, can be inserted into the converter.

The invention is applicable to any form of bottom, and to any method of embedding the bottom in the converter.

The bottom is usually formed of crushed or ground silicious stone, together with a little fire-clay, and sometimes fire-brick. This refractory mixture, which is called "ganister," is usually rammed around the tuyeres and within the mold P.

It is important that the bottom, when placed in the converter for use, should be solid and hard, and compacted together as far as possible into a homogeneous mass in order to resist the abrading action of the fluid metal, slag, and blast in the converter. This is best accomplished by heating the rammed bottom so hot that the materials will partially fuse together. Applying such a heat to a bottom attached to an iron tuyere-box or an iron plate is obviously impracticable, because such a heat would crack and warp the iron, or possibly fuse it.

The improvement secures the hard bottom without subjecting the tuyere-box or iron-plate to an injurious heat; and consists, first, in forming the bottom partly of bricks of ganister or other suitable refractory material, as shown at E F G H I L M N. These bricks are so shaped that they can be set between and around the tuyeres. The small spaces between them and around the tuyeres, as at Q Q R R, are then rammed with plastic ganister in the usual manner, in order to make the bottom continuous. The bricks are provided with notches or their equivalents, as shown at S, Fig. 1, so that when the ganister is rammed between them the outer bricks will hold the inner bricks in place.

The inventor does not confine himself to the precise arrangement of bricks shown. In different cases and with different materials, he prefers to vary the number, size, and distribution of bricks, and sometimes only puts bricks in the central part of the bottom, the remainder being rammed in the usual way.

The bricks are made of about two-thirds silicious stone and one-third fire-clay. This or any suitable mixture is wetted, rammed or pressed into suitable molds, and the bricks thus formed are heated in a furnace or kiln until their cohesion and hardness are so much increased by the action of the heat as to make them better resist the wear of the iron, slag, and blast in the converter. Ordinary fire-bricks of suitable shape may be used, but preference is given to a more highly silicious and cheaper metal.

The improvement further consists in filling the spaces at Q and R around the tuyeres and between the bricks by pouring into them melted refractory material, such as tap cinder or any suitable vitreous slag or compound that will sufficiently resist the iron that is treated in the converter. This fluid filling is tapped from a furnace or otherwise, as may be convenient, and poured into the space it is intended to fill. If any of these spaces are not thus fully closed, pour semi-fluid fire-clay and water into the cracks, and then dry the bottom, when it will be ready for setting into the converter.

Fig. 1.

The improvement further consists in a means of more certainly and rapidly drying such parts of the bottom as are rammed up in the usual way. For this purpose insert plugs, one of which is shown at K, in the top plate T of the tuyere box and ram the ganister around them. Upon the plug form a coarse screw thread. The plug can thus be easily screwed out of the ganister after the ramming, and the thread left in the ganister will hold the material that is put in the plug-hole after the bottom is dried. When the plug is withdrawn, dry the bottom in the usual manner. The hot air of a drying-oven entering at U into the air-space W over the tuyere-box will draw through the hole at K, thus drying and hardening the bottom, and the steam formed in the bottom will more readily escape by means of the hole K. Then stop the hole K with ganister, when the bottom will be ready for use.

Fig. 2.

Claims.—1. A converter-bottom formed in part of refractory bricks placed between the tuyeres, substantially as described.

2. The method of making converter-bottoms in part by means of bricks of suitable refractory material, formed and properly dried and compacted before they are placed in the bottom, and afterward placed therein, substantially by the means and for the purposes specified.

3. A converter-bottom formed of separate solid pieces of refractory material filled in and joined together by melted refractory material, substantially in the manner described.

4. The ventilating-hole K in the refractory material of a bottom, in combination with the air-space W over the tuyere-box, formed in the manner and for the purposes described.

IMPROVEMENT IN APPARATUS FOR CONVERTING IRON INTO STEEL BY MEANS OF HYDROCARBON VAPORS.

Specification forming part of Letters Patent No. 130,540, dated August 13, 1872; reissue No. 5165, dated November 26, 1872. Issued to Mr. Theodore R. Scowden, of Cincinnati, Ohio.

This invention relates to a new and useful construction of those apparatus in which articles of iron have their exterior portions or entire substance converted into steel by treatment with hydrocarbon vapor in a close and highly-heated retort; and consists, in its first part, in the provision of an opening at each end of the retort, through which access can be had to the retort at either end without disturbing or materially cooling the contents of the other end of the retort. It consists, also in the provision of a furnace under each end of the retort, so as to make it possible to heat all parts alike, or either end more or less than the other, as may be found desirable; also in a certain arrangement of pipes for forcing a jet of hydrocarbon at each end and on opposite sides of the retort in connection with a current, to be reversed at pleasure, of deoxygenated air for producing uniform carbonization of the metal in the retort by the effective circulation of these gases.

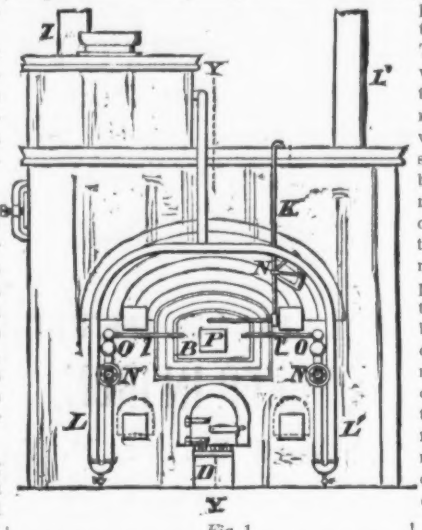

Fig. 1.

Figure 1 is a front elevation of an apparatus embodying my invention. Fig. 2 is a longitudinal section at the line *y y*.

The retort A may be of the represented cylindroidal form, having the arched transverse section here shown. It must be arranged to open at both ends, and have its ends capable of being closed by means of doors or stoppers B B', which are luted and fastened in any customary way of closing the mouths of retorts. The material of the retort is of fire-tile or any highly-refractory material. The retort rests upon a floor of the heated chamber C, which floor constitutes the roof of two precisely similar fire-chambers or furnaces, D D', located under the opposite ends of the retort and fed and operated from opposite ends of the furnace. Flues E E', starting at the fire chambers, pass at first laterally right and left, thence through four separate return-chambers, which rise, coalesce and form the heating chamber Z, around the sides and over the top of the retort, whence the smoke is conducted by two equal channels to chimneys I I', having customary dampers. K K' are pipes which conduct the petroleum or any other hydrocarbons into one or both ends of the retort, and whose force may be due to an elevated reservoir (not shown), or be controlled by a pump either acting directly upon the liquid or on a body of air above it. L L' *l l'* are pipes, one or more of which are used at a time, which conduct deoxygenated air from a furnace, filled with incandescent charcoal, into one or both ends of the retort. All of these pipes are provided with suitable cocks, N, to regulate a needful supply of their contents into the retort, and with joints O or other means of readily connecting or disconnecting them from the retort. Orifices or ports P in the doors B B', closable by stoppers, enable inspection or manipulation of the contents without opening the doors of the retort.

The carbonization or steelifying of iron in retorts supplied by hydrocarbon vapor has heretofore, theoretically and, to a limited extent, successfully been done, but has failed of practical and commercial success because of the expensive, unmanageable, and unequal carbonization of the iron submitted to that treatment. The retort being open at one end only, that end was liable to become cooled to a point below the necessary carbonizing temperature of the metal contained, while the closed remote end would be too highly heated, and being, at the same time, the least accessible, excessive carbonization would result, and even fusion of the metal often took place at this end. This difficulty was aggravated by the fact that in order to remove the contents of the retort from the remote end the articles nearer the mouth, imperfectly if at all carbonized, would have to be taken out and again subjected to the process or become useless. The single furnace, fixed at one end as heretofore, used for carbonizing iron, was not sufficiently uniform in its action throughout the retort, nor did it afford means, as does the double furnace, of exactly tempering and modulating the heat at either end of the furnace, as circumstances and the nature and condition of the work may require or make desirable.

The writer says: I have selected, to illustrate my invention, the form preferred by me, but reserve the right to vary the same in non-essential particulars. For example: In my improvement the two pipes conveying hydrocarbon may be employed alternately or simultaneously, and with them one or more pipes carrying deoxygenated air, and these pipes may be so employed as to produce an active circulation and equal diffusion of the gases throughout the retort, and consequently uniform action upon its contents. I have described my improvements in their application to one retort, but it is obvious that two or more retorts may be employed if desired; and, although describing and preferring oppositely placed fire chambers, two in number, it is obvious that a greater number and differently placed fire chambers might be made to effect the explained purposes of equal or optional firing and heating of the several parts of the retort, and for this purpose the entire furnace might have the represented oblong or a circular or polygonal exterior. When a circular retort is employed the fire-chambers should be arranged in a radial manner; or the chambers may be located on the sides or at any other suitable part of the apparatus, no matter what the shape of the furnace, whether round, oblong, or polygonal.

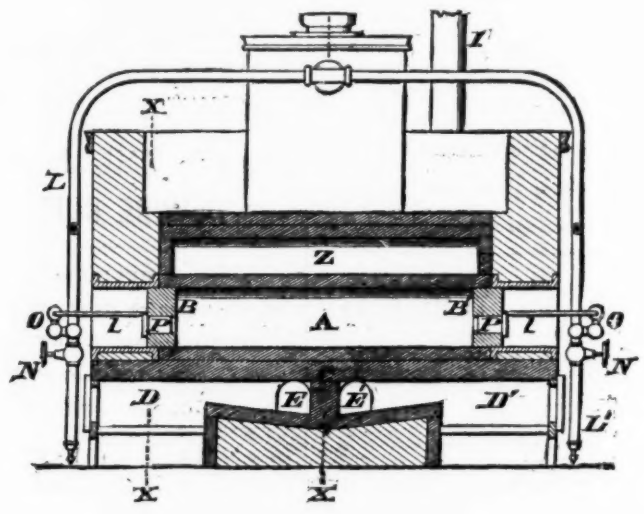

Fig. 2.

I do not claim as new the use of hydrocarbon or other jets in a steelifying retort; nor do I claim broadly, or for other use than such a retort as here adapted, the employment of a stopper at each end thereof and fires at each end of the furnace beneath the same, all of these features and the hydrocarbon process of making steel having been separately known; but by combining and adapting these devices in the manner above set forth I claim to have invented a new and useful furnace, in which the hydrocarbon process of manufacturing steel has been performed and illustrated as a practical and commercial success—a success accomplished simply and solely by an improvement which has given utility and extensive application to what was before practically valueless. This apparatus, although designed and chiefly intended for recarbonization, as set forth, may obviously be employed for decarbonization, if desired. It is believed that a retort constructed as above can be employed for decarbonization, without the necessity of the customary annealing cans, by means of any oxygenizing agent.

Claims—1. The described arrangement of double-ended retorts and furnace-fire at each end, in combination with apparatus for double and alternating supply of hydrocarbon, as and for the purpose explained.

2. The described arrangement in such retort of the duplicated apparatus L L' *l l'* for supplying deoxygenated air and of the hydrocarbon-pipes K K'.

3. The apparatus in a steelifying retort for supplying hydrocarbon and deoxygenated air at each end of the retort, adapted and arranged as set forth.

4. The decarbonization of cast or other supercarbonized iron or steel in a retort, as above described.

The Iron Industries in the Ironton District.

We take the following from the Ironton *Register*:

The Belfont Nail Mill was in operation 270 days of the year 1872. The forge department run 280 days. The number of men employed at the mill, factory and coal mines—the working force necessary to keep the establishment (exclusive of the furnace) in operation—is 425. The amount of muck iron turned out was 8000 tons, and the coal used by the mill amounted to 650,000 bushels. The factory made 146,000 kegs of nails, an unusual proportion of which was the smaller sizes. The amount paid for wages was $240,000. Including this, and the cost of coal, repairs and metal, reckoning the latter at the average market rate, the company disbursed for the mill and factory $640,500. In this amount we failed to count taxes, insurance and sundry other items which will somewhat increase it.

The Ironton Rolling Mill run 268 single turns during the year. The number of hands employed is 226. The production of finished iron amounted to 5559 tons. The amount paid for wages was $141,621·12. This amount, together with the cost of metal, coal, ore, repairs, &c., make a total of disbursements, for the year, of $466,267·63. The past twelve months has been a season of prosperity to the mill, and 1873 finds the company on a good footing, with an excellent mill, and preparing to make important advances.

During 1872 the Lawrence Mill ran 481 turns, making 7674 tons of muck bar and 6814 tons of finished iron. At the mill and coal banks 325 men are employed. The disbursements of the company amounted to $598,479·72, of which $189,398·92 went for labor and repairs $334,740·23 for metal, $50,500 for coal, and $24,300 for ore. The mill shows many tokens of prosperity, and is one of the most substantial and reliable institutions in this iron region.

The Ironton Foundry, Mears, Oldhaber & Co., was in operation 246 days of the past year, during which time 1150 tons of metal were melted. The production of stoves amounted to 13,800, beside hollow ware, &c. The foundry employs 100 men. The disbursements amounted to $125,140·08, of which amount $58,480·85 went for labor alone. No more steady going and enterprising institution of the kind can be found in the West.

The machine shops of Lambert & Gordon run 305 days in the past year, and enjoyed a very healthy and prosperous career. The establishment employs 60 men, and melted 600 tons of metal. The total disbursements for the ear amounted to $83,000.

These five institutions make up the iron manufacturing establishments of Ironton—agencies that increase the value and change the form of pig metal. Prosperity keeps pace with development in this direction. Furnaces are good things and very desirable, but they contribute little toward building up commercial points. Producing pig iron and sending it away will make slow growth of a place; but when that pig iron is taken from the blast furnace, and other forms, requiring labor, are drawn from it, then commence business, commerce and growth. If we would only devise other forms for our pig, or extend our bar iron into more advanced designs, it would be better than if we should find a gold mine back in our hills.

The business of this place depends much upon the establishments we have named. How much this would indicate may be gathered from the following condensed statement of what we have already said:

Number men employed	1,136
Tons metal melted	1,750
Tons of muck iron made	21,747
Tons finished iron	12,473
Kegs nails made	146,000
Total disbursements	$1,913,387·35

Our mills and foundries do not consume much more than one-half the pig iron product of this country. Last year we made 48,000 tons of metal, but there were used in Ironton only 24,636 tons, showing a net product exported of nearly 24,000 tons. If this latter amount were only transformed into more advanced articles of commerce, Ironton would well support twice her present population.

Under the direction of Mr. Casin, the shaft of the Rose Clare Co's mine, Ill., is being widened, and new machinery, dressing and reducing works erected. The Pell Company have put down their shaft 150 ft., and are now raising a large quantity of mineral. The Cincinnati company have their shaft down 110 ft. and also raising fine mineral. The boring of a diamond drill on the vein, in operation at this mine, has developed large masses of mineral. The Mineral City company have completed two furnaces for smelting, and are now producing at the fate of forty-four pig of lead per day, averaging 100 lbs per pig.

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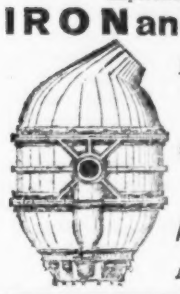
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An Æro-Steam Locomotive.

More than two years have passed away since we first described the so-called æro-steam-engine invented by Mr. Warsop, in which a pump was employed to force compressed air into the boiler. The air so compressed was heated on its way by being made to pass through a tube coiled within the smoke-box, and it therefore imparted to water heat which would otherwise have been wasted, and also mechanically broke up the water and prepared it for ebullition; the ascending bubbles producing the effect of innumerable tubes of a great degree of fineness. It was found in practice that the introduction of the heated air not only produced a considerable economy of fuel, but that the constant agitation of the water prevented priming and the deposition of scale within the boilers; and, on account of these merits, the invention has been extensively applied to stationary and marine engines. For a long period the difficulties in the way of its application to locomotives appeared likely to be insuperable, but these were at length overcome, and the air-pump was fitted, in experimental fashion, to an engine belonging to the Great Eastern Railway Company. The trials first made led to no very definite result: but toward the end of last year the matter was taken up by Mr. Hurst, the locomotive superintendent of the Lancashire and Yorkshire Railway Company, whose goods engine No. 369 was selected for the needful experiments. The results of a year's work with this engine have led to an order for the general adoption of the system, and six engines of different types have been selected to be first fitted, in order to ascertain the proportions of pump and tubing best adopted for each, and with a view to the application of the invention of the other engines of the company.

The engine No. 369 has been employed, since the air-pump was applied to her, partly in general miscellaneous service, and partly in running the daily goods traffic on the Lowmoor and Normanton routes. She has performed these duties with regularity and dispatch, and with a distinct augmentation of her previous powers, as tested both by the traffic and mileage returns, and also by the experience of her drivers. It would have been impossible for the company to have submitted to the derangement of their ordinary business which would have been produced by running special experimental trains, weighted to a definite tonnage, and timed to definite rates of speed; and therefore the facts have had to be picked up by the best comparison which could be made between the original working of the engine and her performances when assisted by the air-pump. This comparison has been rendered additionally difficult by the introduction, from time to time, of changes in the air mechanism which were suggested by experience, and which were in every instance followed by some improvement; so that the *maximum* of gain has only gradually and recently been obtained, and the mean of the daily work for the year is much inferior to what the engine now accomplishes. Due allowance being made for these considerations, it has been found that certain very definite advantages have been secured. The saving of fuel, if not very large, is unquestionable; and on the average of the year, as compared with that of the previous year, amounts to the difference between 40·48 lbs., and 42·695 lbs. per train mile. On a more restricted period the gain is much greater, since on the 8th of March, 1871, the consumption of the engine was as high as 52·2 lbs., whether worked by the air system or under steam in the ordinary way. This was gradually reduced to 43·7 lbs. per mile by the end of the same month, to 41·4 lbs. by the middle of April, to 39·1 lbs. by the middle o May, and to 34·4 lbs. by the end of September. Moreover, if the results obtained since the last alteration of the heating surface of the air coils, on the 19th of June, 1872, be compared with those of the corresponding period of 1871, under steam only, it appears that in 1872 the mileage on the four last returns was 5964, and the coal consumption per mile 34·96 lbs., against a mileage of 3596 in 1871, and a coal consumption of 42·9 lbs. per mile.

As regards the absence of scale, the results are greatly more important. It has not only been found that new tubes, inserted into the boiler during the employment of the air system, remain perfectly clean and bright, but also that the scale previously formed upon old tubes becomes gradually loosened and removed, after being first honey-combed in a very curious manner. The incrusted deposits from water are so serious an evil in all boilers, that to prevent their formation is, if nothing else were gained, the attainment of a highly desirable object. Upon these two points, the fuel consumption and the incrustation, the reports made to the company have been quite conclusive, and have been such as to determine the extension of the system to which we have referred.

Beside these there are other, perhaps minor, advantages which are by no means unworthy of note. Under the use of the air system there is no priming. This was long ago proved in the case of marine engines; and is alone sufficient to render the invention a boon to passengers by a steamer, who are now constantly annoyed by the dirty water sent out from the funnel. The air also makes the engine more "lively," in driver's phrase, under steam, and exerts a very remarkable influence in raising and maintaining the pressure in the boiler. The use of the air-pump, when running down an incline preparatory to an ascent, is found to be exceedingly valuable, and gives an increased pressure which comes into practical work as soon as the ascent is reached. A few evenings ago we had an opportunity of traveling upon engine No. 369, when she was hauling an unusually heavy goods train from Liverpool to Normanton. Her performance under air and steam was remarkably good, and it was found that she began to drag perceptibly as soon as the air was shut off when she was ascending an incline. Two pyrometers were inserted for the occasion; one in the smoke box, and the other in one of the coils of the air-tube; and the temperature of the latter rose to within 20° or 30° of that of the former, which ranged at about 600 Fahrenheit, thus showing how very large an amount of otherwise waste heat was taken back into the boiler, and utilized in the production of steam. The condition of the water in the gauge glass also attracted notice, for, although the water used was of a rather inferior character, there was a total absence of the frothy scum so often seen in the tube. The water was, indeed, throughout the whole journey, so clear and pellucid that the level at which it stood could not be determined at a glance, and the driver asserted that this was always the case. The water remained, moreover, at a singularly uniform level, showing that the injectors were acting without interference from the air. The driver, a shrewd and practical man, was very decided in his testimony in favor of the system, and said that the engine, since its adoption, not only handled her loads better than she had ever done before, but also better, according to his observation, than any other goods engine of the company.—*London Times.*

Reminiscenses of Trade in Sheffield in the Last Century.

Formerly the manufacturers had no trade connections, but depended entirely upon persons coming to the town to purchase the articles manufactured. These traders were called "chaps or chapmen," and were chiefly Scotch or Irish, with some English. Their chief resort was Tommy Rose's, The Bird-in-Hand, Church Lane. The house stood where the Cutlers' Hall in part now stands. They generally had with them two, three or more packhorses for the conveyance of the goods purchased. When a "chap" arrived, the ostler went round to each of the manufacturers to inform him of the fact, and each gave him a penny for his information and trouble. An old man said, "Olve been raand wi' him mony a toime when Oi war a lad, aboon 70 year sin." Sometimes there were two, three or four "chaps" in the house at one time, and each had a separate room for business. The cutlers waited until all was ready, and then went upstairs "i' their kales." If they bargained they left the goods and took the money home with them. The house was sometimes quite crowded. There were other houses in the town which travelers or "chaps" frequented upon the same business, but none was as popular as Tommy Rose's. This was a very precarious way of doing business. As the makers had the materials to find, as well as the labor, it put them to great inconvenience, and caused many families to suffer great privations during the time they had the goods in hand. To remove this difficulty the Cutlers' Company frequently advanced money on goods deposited with them, without any interest being charged. This was always thankfully accepted until the goods could find a market. In 1768 the Town Trustees let out £200 to twenty scissor smiths, upon bond in small sums. In 1741 Sir Fras. Sitwell bequeathed £400 to the Cutler's Company, to be let out in sums not exceeding £5 to any necessitous member or other inhabitant. It is remarkable there is no account of this in the company's books, although there are persons now living who can remember their fathers having received money from this source. These benevolences assisted the trade a great deal, for if a person had a stock of goods he could not dispose of, he could take them to the Cutlers' Hall and deposit them there until he found a market. Tommy Rose's being next to the Cutler's Hall, where the "chaps" usually put up, they were easily removed if wanted.

In the year 1710 a person of the name of Wright introduced the first stage wagon. Before that all public traveling was equestrian, and the conveyance of all bulk and weight was effected by carriage as distinguished from draught. The burden was fitted to the animal's back—which not unfrequently was ill-fitted to bear it—and shambling along cross roads, fording rivers, and climbing steeps, the jaded brute day by day pursued his wearied route. In those days a busy street at dawn would present an appearance only now to be seen in Cairo or some other Eastern city when a caravan is preparing to start on its journey—only here, horses instead of camels, or asses, or mules, were the beasts. Often a train of not fewer than fifty in number were being laden—the majority with the heavy produce of the manufactories, others with market stock, live and dead—grain and poultry, and vegetables, and even pigs. At last, when all was ready, the bells tinkled, and human beings poured forth from the inn. These consisted of travelers and their friends, and merchants who, either accompanying their wares, or on some other business, were journeying to the capital. Perched on high, amidst boxes and bundles, were children and women, old men and maidens, leaving amidst the tears of their acquaintaince; whilst the more active of the men were either starting on foot, or more easily bestriding a beast which had some appearance of saddle and pillion on its back. The orders for march being given, onward they moved through the town, into the country, over roads on which a track was paved for the especial use of the pack-horse train; but lanes also had to be traversed, in which holes constantly occurred, producing violent shocks. Across swamps, where the sagacity of the animals had to be trusted, across swollen rivers, where the women and the live stock were alike alarmed, the cavalcade at last reached its longed-for halting place for the night.

Until 1747 or thereabouts there was no traveling from hence to sell goods or solicit orders. Mr. Fox, of Westbar—he who built the lofty houses near West court, in one of which he afterward lived, and Mr. Samuel Fowler in the other—was the first person to undertake a journey to London for this purpose. It was necessary to go on foot, and before starting he made his will and gave a large farewell party to his friends. Nothing that his wife or friends could say to him could dissuade him from encountering all the fatigue, hazard, and difficulty of the journey. He started on foot, carrying his treasure on his back. The first day he walked as far as Mansfield, where he rested for the night. The next day he had to wait until a sufficient number of travelers met together to venture across Nottingham forest, on account of the numerous robberies that were committed on travelers there, and also because of the intricacies of the road. He reached Nottingham in safety, and ultimately he reached London, sold his goods to his satisfaction, and obtained plenty of orders for more. His example was soon followed by others, who went upon similar business, but this is believed to have been the first instance of personal intercourse with the Metropolis.

A similar instance is afforded by Mr. Thomas Wilson, grandfather of the present Mr. Thomas Wilson, of Sycamore street. He traded for a long time entirely with the factors. At last he determined to offer his knives—shoemakers' and butchers'—for sale himself. Packing up his goods, he took them on his back into Lancashire. Wherever he sold any knives, he told the purchasers he should come again at a fixed period of time, and if the article did not suit he would return the money. On his next journey he had no complaints, but so much greater demand that some of the retail shops would have purchased the whole of his stock, but he kept to his promise to the others. He readily sold all he had taken, and soon returned home to manufacture more goods with which to complete his journey This was the first time that the trade mark of the Three Peppercorns with the name "Wilson" went into the market; now it is a guarantee of good quality in all the countries of the world.

Enoch Trickett was a respectable file manufacturer, in Coalpit lane. His brother William was Master Cutler, 1771. Enoch was a genuine, broad "Old Shevvielder." His shirt sleeves rolled up, wearing a leather apron, whose bib was up to his neck, without neckerchief, he was not to be distinguished from his workmen. When the commercial spirit extended itself in the town, Enoch thought he would go to "Lunnon" and see if he could sell some files and obtain orders, thinking he should get better prices there than in Sheffield. He went into a merchant's warehouse, and asked if they were in want of any files, producing his patterns, which they examined. They asked prices, and what discount was allowed. "Discount," he says, "what's that? Oi ne'er heard tell on it afore." They explained that by making them an allowance of so much per cent., they would give him an order, and upon the receipt of the goods would remit him the money in payment. "Way, oi've telled yo t'proice on 'em, an' beloike ois't expect t'brass for 'em." Further explanations only resulted in the reply, "Soa yo wanten me to gi yo so much money to buy t'foils?" The terms on which they would give him a good order were explained, but Enoch's patience was exhausted, and "lapping" up his files, he said, "Nay, lad, nay; oi can sell 'em for moor nor that at Breetmoor's onny toime, and tak t' brass hoam wi' me when ween 'livered." It is currently reported that Enoch never again tried his hand as a commercial traveler. When umbrellas first came into vogue in Sheffield, Enoch's brother got one. "See thee, see thee," said Enoch, "ahr Bill has getten a waukin' stick wi' petticots on."

It is said that one Sheffield manufacturer—a maker of saws—showed more "gumption" in getting a London trade, and laid the foundation of the fortune he realized in this way. He sent round to the London dealers a man dressed as a carpenter, fresh from his workshop—in apron, shirt sleeves, and the rest. At each place he asked for one of ——'s saws. They never heard of such a maker, but they had saws by this, and that, and the other. None of them would do; ——'s were the best; they would have none but ——'s in his shop. Soon afterward the maker, whose saws had thus been asked for, went round soliciting orders. He returned to Sheffield with his book full, and his fortune was made.

The Mineral Wealth of Japan.

Mr. J. Kadisly, who has traveled extensively in the East, and collected a great variety of mineral specimens in Japan, says:

Japan is one of the richest mineral regions on our globe, and may—once all its treasures laid open—well rival with the Ural mountains, with California, Mexico, or any of the rich mineral States of South America. Beside the riches represented in my collection, there are strong indications that the mountains in the North of Nippon, which, from 38° L. N. up to the Arvo-Mori Bay 41° L. N. divide the territories of Mutsu on the east and Dova on the west, are rich in auriferous quartz, and that the placer gold, often clandestinely offered for sale, is found in the tributaries of the Fia-Ami-Karva, a river which takes its source on Mount Yvayasi, 40° L. N., runs along the said chain of mountains and opens into the Eastern Sea of Japan, near the island of Figami, 38° 40' L. N. Many rich mines of different metals and other useful minerals also, as graphite, lime, white and red chalk, red and yellow ochre, realgar, operment, elastic bitumen, Iceland spar, fluoric spar, talc in different shapes and qualities, alabaster, meerschaum, purrolane, etc., are known to exist in the interior of the country, but are not worked yet, or only very imperfectly by the peasants, who only work on the surface when they have a day or two to spare from the works in the rice plantations, but never take the trouble to go deeper, where the best qualities of minerals are found.

Although the regular and rational working of these mines, either by concession to Japanese or foreign capitalists or by exploitation for the government's own account, under the management of a foreign engineer, would, beyond any doubt, greatly and rapidly improve the finances of Japan, as well as the social condition of the working classes, in procuring permanent work for thousands of homeless and friendless razzias (poor outcasts), who during the cold season are often seen by half dozen dying of hunger and cold on the wayside of the Tocaido, between Yeddo and Yokohama—strange and deplorable cases of revolting misery, in a country of so great agricultural and mineral riches, and so flourishing a commerce—yet the Japanese government hesitate to open the mineral treasures of their country, for fear, perhaps, of too great an influx of foreign immigration, which would cause political troubles in the country. Let us hope, however, that the present liberal government of Japan, who have declared themselves so open and firm for social progress and civilization, will soon have subdued the few reactionary elements in the Empire and be free after to carry out, without reserve or fear of internal political troubles, the great reforms, which are necessary yet to make Japan a truly rich, civilized, and well-governed country, worthy to take its social and political standing among the civilized countries of Europe and America.

The provinces known to-day to be richest in mineral wealth in Japan are the provinces of Satsuma, Figo, and Fisen, on the island of Kiou-Siou, the provinces of Kanga, Mino, Bizen, and Kafi, on the Great Nippon and the little island of Sado, near the west coast of Japan. The best and richest copper mines are located in Kiou-Siou. Japanese copper has been known for centuries as the best in the world. It contains a fine percentage of gold. The Dutch, who for more than two centuries have been the only civilized nation in commercial relations with Japan, and who had permission to export from Dessima one whole cargo of copper every year, always smelted the Japanese copper again in Holland, and extracted the gold by an amalgamating process. The Japanese of our days know the value of their copper better than their ancestors, and take the gold out of it themselves before they allow it to go to the market.

Japan has already several great coal fields in full and systematical exploitation. The qualities, although inferior yet to European or American coal, begins to contend successfully with the Australian coal, which is shipped yearly to the ports of Yokohama, Hiogo, and Nagasaki. Several steamship companies begin to mix Australian and Japanese coal in equal parts, and find the fuel good and the arrangement profitable, as Japanese coal is a great deal cheaper than Australian coal, and only very little inferior in quality to the latter. Deep shafts have been sunk now on several rich stratas, and better qualities found than before. I know about the existence of two more promising coal fields with rich stratas, which are not worked yet, and there may be many more, known, perhaps, only to a few peasants in the neighborhood.

Fine kaolin and a fine bluish clay abound, especially in the southern part of Nippon, in Kiou-Siou and Sitkokf. These two minerals furnish the material for that fine and almost transparent Japanese earthenware, so much admired, and exported to all parts of the globe.

The whole Japanese Archipelago is of volcanic geological formation. Many of the smaller islands consist only of lava, obsidian, and pumice stone; on the larger ones, taken in a totality, almost all the geological formations are represented, as seen in my collection Active volcanoes are at constant work yet in the south and in the north of the country; those in the center are all extinct and the craters of the Fusi-yama and the Hakoni mountains afford ample material of study for the geological explorer. Earthquakes are very frequent in Japan, especially between the equinoxes, but never so violent as to cause great damage.

Japan has already two navy yards with dry docks, one in Nagasaki and the other in Yokolzka, a few miles distant only from Yokohama. Yokolzka, under the direction of an able French engineer, has its foundries and extensive, well supplied workshops, where the engines and boilers are made for the steamers that are built in their yards. Several new steamers have been launched in Yokolzka; among others the Kome, a fine paddle steamer, with a first rate engine, plying daily between Yeddo and Yokohama. The works and yards in Yokolzka are being enlarged for the construction of men-of-war.

The Clyde Shipbuilding Trade in 1872.—It appears that 1872 has been the most prosperous year in shipbuilding yet experienced on the Clyde. Although the number of vessels launched has not been quite up to each of the last few years, the tonnage exceeds 1871 by 28,000 tons and 1870 by 34,300 tons. The increase of last year has been larger than any yearly increase for many years past, and has been entirely in the class of screw steamers. The year's tonnage of screw steam vessels is 40,800 tons above 1871, 67,000 tons above 1870, 73,000 tons above 1869, and 77,500 tons above 1868. But while the screw vessels have so enormously increased, all the other classes seem on the decline. In the building of war vessels, 1872 has been a blank on the Clyde. In paddle-steamers there has been a considerable decline, and the year only shows 6200 tons, as against 10,900 in 1871, 10,150 tons in 1870, 8300 tons in 1869, and 6300 in 1868. In yacht building there has been a good trade, chiefly in screw steam vessels, the commodores and vice-commodores of most of the English yachting clubs having followed the example of the commodore and vice-commodore of the Royal Northern Yacht Club, in having steam vessels built for attendance at the annual regattas and cruises. Hopper barges and dredgers also show a falling off as compared with 1871, but exceed the two preceding years. In iron sailing vessels there is a slight improvement over the preceding year of 2200 tons, but as compared with 1870 the decrease is 30,000 tons, and with 1869 the decrease is 51,000 tons. Composite and wooden ships are equally low.

The North of England.

The following is a list of iron works in the Cleveland District at the close of 1872, as compared with 1871, the names of the proprietors, the number of furnaces in blast and out of blast:

Works.	Proprietors.	Furnaces blowing.	Furnaces out.	Furnaces built.
Lackenby...	Lackenby Iron Co.	2	..	2
Eston.....	Bolckow, Vaughan & Co. Ld	7	..	7
South Bank.	Thomas Vaughan	6	3	9
Clay Lane..	Thomas Vaughan	6	..	6
Cargo Fleet.	Swan, Coates, & Co	4	..	4
Normandy..	Jones, Dunning & Co	3	..	3
Ormesby....	Cochrane & Co	3	..	3
Tees.....	Gilkes, Wilson, Pease & Co	5	..	5
Middlesbr'h	Bolckow, Vaughan & Co. Ld.	3	..	3
Tees Side..	Hopkins, Gilkes & Co., Ld.	4	..	4
Linthrope..	Lloyd & Co.	6	..	6
Acklam.....	Stevenson, Jaques & Co.	4	..	4
Ayresome..	Gjers, Mill... Co.	4	..	4
Newport....	B. Samuelson & Co.	8	..	8
Clarence....	Bell Brothers	5	..	5
Norton	Norton Iron Co., Limited	3	..	3
Thornaby..	W. Whitwell & Co	3	..	3
Stockton....	Stockton Iron Furnace Co.	3	..	3
Grosmont...	C. & T. Bagnall, Jr.	2	..	2
Glaisdale..	South Cleveland Iron Works Co., Ld.	3	..	3
S. Durham..	South Durham Iron Co	3	..	3
Witton P'rk	Bolckow, Vaughan & Co., Ld	5	..	5
Consett.....	Consett Iron Co., Limited	5	2	7
Wear.....	Bell Brothers	1	..	1
Jarrow.....	Palmer's Iron Co., Limited.	5	..	5
Norton	Nowegian Titanic Iron Co.	2	..	2
Carlton	Industrial Iron Co., Limited.	2	1	3
Middleton..	Geo. Wythes & Co.	3	..	3
Ferry Hill..	Rosedale and Ferry Hill Iron Co., Limited	6	..	6
Tow'aw	Weardale Iron Co., Limited.	2	..	2
Elswick	Sir W. G. Armstrong & Co.	2	..	2
Walker	Losh, Wilson & Bell	2	1	3
Tudhoe.....	Weardale Iron Co., Limited.	2	..	2
Seaham	Watson, Kipling & Co.	1	..	1
	Total for Dec. 1872.	130	7	137
	Total for Dec. 1871	124	7	131

COMPARATIVE STATISTICS OF THE NORTH OF ENGLAND IRON TRADE.

Make of Pig Iron.

1872	tons,	1,562,952
1871	"	1,881,236
1870	"	1,905,377
1869	"	1,459,508
1868	"	1,223,418

Makers' Stock, Dec. 31.

1872	tons,	40,667
1871	"	65,671
1870	"	104,606
1869	"	84,242
1868	"	80,806

Stock in Warrant Shares Dec. 31.

1872	tons,	831
1871	"	2,730
1870	"	12,740
1869	"	31,374
1868	"	72,020

The Chinese Sensation at Beaver Falls.—On the evening of January 27th another company of Chinese workmen arrived at the Beaver Falls cutlery manufactory. The people of the place are still greatly excited, but no attempt has been made to drive the Chinese away or prevent their working. The white workmen, however, have petitioned Congress to prohibit any further importations of Mongolians under contracts made in China. The petition concludes as follows: "That about one hundred and sixty-five Chinese laborers have been imported for a cutlery company at Beaver Falls, thereby causing the discharge from the works of white American mechanics and workmen; that two hundred more Chinese direct from China are said to be engaged and on their way for the same and other works of this company, to the exclusion from the works of our own people; that contracts have been made through one of their own race for long periods of servitude on their part at wages so low as to forbid competition by American workmen; that their habits are so debasing as to insure the demoralization and degradation of all Christian communities brought in contact with them; that their introduction into the United States in the manner it is done shows a manifest attempt to revive the institution of slavery, and that it is an act of bad faith toward the working people of Pennsylvania and the United States, insomuch as that the protection of thirty-five to fifty per cent. against the importation of foreign cutlery was enacted for the purpose of protecting the American laborer against cheap foreign labor. As a means, therefore, to be saved from such evils, and in behalf of our own working people, we ask you to pass a law prohibiting any further importation of Chinese laborers under contracts made in China, or that you will authorize the free importation from foreign countries of such articles or manufactures as are or may be produced in the United States by and through Chinese cheap labor so contracted for."

The statement which lately appeared in the New York daily papers that a thousand workmen had been thrown out of employment by the suspension of the furnaces at [illegible] of Peekskill is incorrect. Many of the works have not suspended at all, while others a temporary suspension has occurred for the purpose of taking account of stock, repairs, etc. The number of men now idle is not over 300, and work will again commence in a few days in those foundries that have temporarily suspended operations. This temporary suspension is usual at this time of the year, and although has been prolonged this year to three or four weeks, in the case of some companies, on account of the recent increase in the price of iron, yet there are no signs of dullness in Peekskill, and work will soon be proceeding as briskly as ever.

Durable crucibles for melting steel, may be prepared from a mixture of ten parts ground and washed chamotte, ten graphite, fifteen asbestos, three quartz (not [illegible]) and twenty-two fire proof clay. The asbestos, as a fiberous body, prevents the falling asunder of the crucible when cracking, and thus any loss can be prevented.

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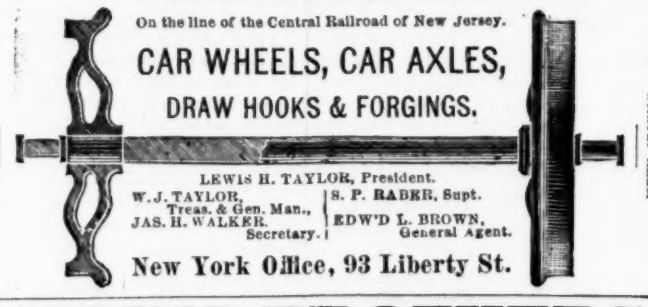

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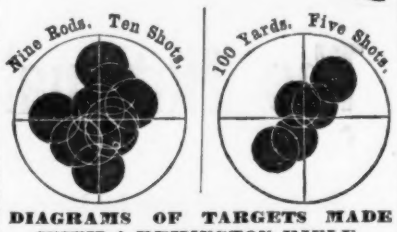

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Account of Some Experiments on the Oxidation of Iron.

BY F. GRACE CALVERT, PH. D., F. R. S.

Some two years since, Sir Charles Fox inquired of me if I could give him the exact composition of iron rust, viz., the oxidation found on the surface of metallic iron. I replied that it was admitted by chemists to be the hydrate of the sesquioxide of iron, containing a trace of ammonia; to this he answered, that he had read several books on the subject, in which the statements referring to it differed, and from recent observations he had made, he doubted the correctness of the acknowledged composition of rust. He further stated, that if he took a bar of rusted wrought iron and put it into violent vibrations, by applying at one end the fall of a hammer, scales would be separated, which did not appear to him to be the substance I had described.

This conversation induced me to commence a series of experiments, which I shall now detail.

I first carefully analyzed some specimens of iron rust, which were procured, as far as possible, from any source of contamination. Thus one of these samples was supplied to me by Sir Charles Fox, as taken from the outside of the Conway bridge, the other secured by myself at Llangollen, North Wales.

These specimens gave the following results when submitted to analysis:

	Conway Bridge.	Llangollen.
Sesquioxide of iron	92·500	93·094
Protoxide of iron	6·177	5·810
Carbonate of iron	0·617	0·605
Carbonate of lime	0·295	0·295
Silica	0·121	0·196
Ammonia	trace	trace
Total	100·000	100·000

These results clearly show the correctness of Sir Charles Fox's statements, that the composition of the rust of iron is far more complicated than it is stated in our text books. Therefore, the question may be asked, is the oxidation of iron due to the direct action of the atmosphere, or to the decomposition of the aqueous vapor; or does the very small quantity of carbonic acid which it contains determine or intensify the oxidation of metallic iron? To reply to these queries, I have made a long series of experiments, extending over two years, which, I hope, will tend to throw some light on this very important question; and although it appeared to me an easy matter to solve, still I have had many difficulties to overcome, which will be described as they occurred in the course of my investigation.

The first series of experiments consisted in placing crinoline and steel wires, very carefully cleaned, in tubes containing pure, dry, or moist oxygen; and in another series of tubes, containing the same gases, was added 1 per cent. of carbonic acid or a trace of ammonia.

Before describing the facts observed, I must state that the oxygen was prepared from pure chlorate of potash, mixed with a little binoxide of manganese, and the gas obtained passed through several feet of U tubes, filled with glass moistened with sulphuric acid and caustic potash. The carbonic acid was purified by washing it with water and passing it through U tubes containing sulphuric acid. The ammonia was purified by first passing it through a saturated solution of ammonia, and then over caustic lime. These purified gases were then introduced into tubes having 1 centimetre diameter and 30 centimetres in length, which had been previously filled with dry mercury, and containing an iron blade, to the bottom of which had been fixed a small mass of gutta-percha, so as to isolate the iron from the mercury, and prevent galvanic currents.

The results of the above experiments were so unsatisfactory that I was led to infer that I had overlooked some source of error; and it was so; small globules of mercury having adhered to the perfectly polished surfaces of the iron, had become centers of galvanic action, determining the oxidation on the blades, and thus rendering the series of experiments discordant.

To overcome this source of error, cleaned blades of steel and iron, having a gutta-percha mass at one end, were introduced into similar tubes to those employed in the previous experiments, and were placed over a mercury trough; the atmospheric air was displaced by a current of pure oxygen conducted to the top of the experimental tube, and it was then easy to introduce into them traces of moisture, carbonic acid, and ammonia. After a period of four months the blades of iron so exposed gave the following results:

Dry oxygen	No oxidation.
Damp oxygen	In 3 experiments; only 1 blade slightly oxidized.
Dry carbonic acid	No oxidation.
Damp carbonic acid	Slight appearance of a white precipitate on the surface of the iron, found to be carbonate of iron; 2 only out of 6 experiments did not give this result.
Dry carbonic acid and oxygen	No oxidation.
Damp oxygen and carbonic acid	Oxidation most rapid, a few hours being sufficient; the blade assumed a dark green color, which then turned brown ochre
Dry oxygen and ammonia	No oxidation.
Damp oxygen and ammonia	No oxidation.

The above results prove that, under the conditions described, pure and dry oxygen does not determine the oxidation of iron; that moist oxygen has only a feeble action; dry or moist pure carbonic acid has no action, but that oxygen containing traces of carbonic acid acts most rapidly on iron, giving rise to protoxide of iron, then to carbonate of the same oxide, and lastly to a mixture of saline oxide and hydrate of sesquioxide.

As these facts tend to show that carbonic acid is the agent which determines the oxidation of iron, I am justified in assuming that it is the presence of carbonic acid in the atmosphere, and not its oxygen or aqueous vapor, which determines the oxidation of iron in common air.* Although this statement may be objected to at first sight, on the ground of the small amount of carbonic acid gas existing in the atmosphere, still we must bear in mind that a piece of iron, when exposed to its influences, comes in contact with large quantities of carbonic acid during 24 hours.

These results appeared so interesting, that I decided to institute several series of experiments.

First Series.—Perfectly cleaned blades of iron placed in bottles, filled with ordinary Manchester water, were rapidly covered with rust, whilst similar blades, placed in the same water previously deprived of air and carbonic acid by boiling, remained free from rust for a period of four weeks; thus proving that oxygen and carbonic acid are necessary for the production of oxide of iron in presence of water.

Second Series.—Into bottles filled with some pure distilled water (which had been boiled and then allowed to cool in corked flasks) blades of iron were introduced, and a part of the water in the bottles was displaced by common air, pure oxygen, or carbonic-acid gas; but the results were unsatisfactory. I then decided to keep the upper part of the blade dry; to effect this, clean blades of crinoline wire were introduced into bottles containing pure oxygen, and then boiled and cooled distilled water was introduced by means of an aspirator, until only half the blades were immersed in the water. By this method I was enabled to ascertain the comparative degree of oxidation of that part of the blade dipping in the water, and the results observed were as follows:

The section of the blades out of the water remained bright for several days, whilst that in the water became attacked in about 6 to 12 hours; and the deposit increased so quickly that after two or three days, the blade was entirely covered with an ochre deposit of the hydrated sesquioxide of iron. This rapid oxidation of iron, under these circumstances, appeared to me to be entirely due to a galvanic current; for the oxide was deposited in two separate columns which left the outside edges of the blade perfectly bright as well as the center of it, each separate column apparently representing the poles of a battery. In fact, the production of this precipitate was so rapid that, after a short time, a considerable amount was found as a deposit in the bottle.

To be certain that the oxidation of the immersed portion of the blade was not due to the fixation of oxygen dissolved in the fluid, but to the decomposition of water through a galvanic current, I examined the gaseous mixtures existing in the upper part of the bottle, and found hydrogen in large quantities, thus proving that the water had been decomposed, its oxygen being fixed by the iron, whilst the hydrogen was liberated.

ACTION OF OXYGEN-CARBONIC ACID ON IRON IN PRESENCE OF WATER.

To ascertain the influence which carbonic acid exerts on the oxidation of iron, I prepared mixtures of oxygen and carbonic acid in the following proportions:

25 of oxygen to		75
50	"	50
75	"	25
84	"	16
88	"	12

Having introduced iron blades, and the above gaseous mixtures into bottles, they were inverted over water, so that their necks dipped into this fluid; when half the gaseous mixture had been displaced by aspiration, as in the previous experiments, the following results were obtained, viz: Whilst that portion of the blade standing out of the water in the previous experiments remained for weeks unoxidized, in this series the same section of the blade assumed rapidly a dark color, which became afterward of a dark brown. This change of color was no doubt due, first, to the formation of carbonate of the protoxide of iron, and then the excess of oxygen in the mixture converted the carbonate into magnetic or saline oxide of iron, with a little sesquioxide of iron. Whilst these phenomena were proceeding with that portion of the blade exposed to the gaseous atmosphere, the one dipping into the aqueous solution was observed to lose its brilliant and metallic lustre in a few minutes, presenting a black appearance, which became at the end of three hours, of a dark greenish hue, due to the formation of similar compounds as those above described.

In all these experiments the water became not only turbid after a short time, but on the surface of the same floated a considerable amount of magnetic oxide and carbonate of the protoxide of iron, and which varied in quantity according to the relative proportions of oxygen and carbonic acid employed. This series of experiments confirms again the previous ones, that carbonic acid is a most active agent in determining the oxidation of iron.†

ACTION OF CARBONIC ACID ON IRON IN PRESENCE OF WATER.

Having studied the action of oxygen, and of carbonic acid and oxygen, on iron in the presence of water, I was desirous of ascertaining what would be the action of carbonic acid and water. I operated in a similar manner as in the previous experiments, and observed that the blades in the gaseous mixtures had assumed a dark gray appearance; that in the liquid was black, the carbon having been rendered perceptible by the iron having been dissolved as carbonate of protoxide of iron, soluble in the excess of the carbonic acid. After a few days, a perfectly white deposit was formed on the edge of the water, which gradually increased, and became so abundant that some fell to the bottom of the vessel. Water had been decomposed and hydrogen liberated.

I again made another experiment, which further illustrates that carbonic acid is the real determining agent of the oxidation of iron. Thus, a blade of steel placed in pure water, which had previously been deprived of all gaseous mixtures by long boiling, and then allowed to cool, the metal remains bright for several days, and when any signs of oxidation appeared, it was only on a few parts of the blade. The careful examination of this fact led me to infer that the limited action which had taken place might be attributed to traces of impurity in the iron; and this view was supported by the previous observations described, on the influence which minute globules of mercury exert on the oxidation of iron, as well as the known influence which a few thousandths of antimony, platina, tungsten, sulphur, phosphorus, etc., impart to iron; and, again, the facts I published a few years ago, that by covering the 1-100 part of a blade of iron with zinc, the whole of the blade is prevented from rusting when plunged in soft or sea water; whilst platinum, under the same circumstances, promotes, in a marked degree, the oxidation of iron. Therefore, if a minute quantity of a substance modifies the properties of iron so as to facilitate or retard its oxidation, we may, I think, fairly assume that any impurity in the purest steel (watch springs) may give rise to the few specks of oxide which were observed in the steel placed in boiled distilled water.

Whilst I was engaged in the above experiments, it occurred to me that it might be useful to make a series with the view of throwing light, if possible, on a fact stated by Berzelius, and well known to alkali and soap manufacturers, viz., that caustic alkalies have the property, even when dilute, of preventing the oxidation of iron.

Do the alkalies possess the curious property of rendering the iron "passive," or, as Berzelius has supposed, is the iron in a negative electrical condition? This is a very difficult question to solve. From many observations I have made I am led to believe that the iron is in a passive state; and this opinion is based, not only on the known data that a blade of iron is not attacked by strong nitric acid, and that we have no electrical current if one fluid and one metal are brought in contact; whilst if two fluids and a metal, or two metals and one fluid, are employed, a galvanic current is generated. My experiments show that not only caustic alkalies possess this peculiar property, but also their carbonates and bi-carbonates; and I hope that the following experiments will throw some light on this point. A blade of polished iron was dipped into a solution of caustic soda, and at each end of the blade was attached a wire communicating with a galvano-multiplicator, and no galvanic current was generated; and, again, when blades of perfectly polished hoop iron were placed in bottles half filled with solutions of caustic alkali, carbonates and bi-carbonates, containing from 1 to 5 per cent. of these compounds, and only a part of each blade was immersed in the solution, the other parts being exposed to atmospheric air enclosed in the stoppered bottles, the results were that, after 3 months, neither that portion of the blade dipping in the liquid, nor that in the atmosphere, was in any way rusted in the solutions containing 5 per cent. of alkali; and in the experiments with 1 to 2½ per cent., only part of the blades out of the water were slightly oxidized.

I was much surprised to find that the carbonates and bicarbonates of the alkalies acted in the same manner as their hydrates in preventing the oxidation of iron, not only on that part of the blade immersed in the solutions, but also on that which was exposed to a damp atmosphere of common air. Previously to obtaining these results, I was inclined to believe that caustic alkalies prevented the oxidation of iron by absorbing the carbonic acid of the atmosphere; but, as carbonates and even bicarbonates act in a similar manner, it is evident that this view of the action was erroneous.

The results above stated not coinciding with those obtained by Payen, and given in Gmelin (vol. v., p. 185), I repeated his experiments and found that the portions of the blades of iron immersed in dilute alkaline solutions, as described by him, are preserved from oxidation, but that the portion out of the liquor becomes covered with oxide, which increases in inverse ratio to the strength of the solution, and that when the proportion of 1 part of the alkali to 2000 parts of water is reached, the oxidation of the iron proceeds rapidly on that part of the place just above the surface of the water.

The series of experiments confirms the opinion already expressed, that the iron exists in a passive condition, and that this condition only attains sufficient power to resist oxidation by atmospheric oxygen when there is 5 per cent. of either hydrate or carbonates of alkalies in solution.

I have repeated also M. Payen's experiments on the preservative action of weak solutions of carbonate of soda, and find that my results do not correspond with his. He states that 1 part of a saturated solution of carbonate, when diluted with 54 parts of water, will preserve iron from rust, while 1 with 59 will not. I find that the iron rusts in both cases, thereby proving that stronger solutions are necessary to prevent oxidation.

I have made many experiments with the view of discovering the cause of this interesting preservative action which alkaline solutions exert on iron, but have failed. Knowing the destructive influence which sea-water has on iron, and the serious injury done on iron ships through the action of bilge water, a series of experiments were made with sea water, to which was added such a quantity of caustic soda, or potash, or their carbonates, that, after the salts of lime and magnesia were decomposed, there still remained in the solutions 1 to 5 per cent. of alkalies or the alkaline carbonates; and when iron blades were introduced into such liquids, they gave the same results as when iron had been dipped partially into an alkaline solution of Manchester water. I would propose, in conclusion, that a certain quantity of soda ash should be introduced from time to time into the bilge water of iron ships, as by so doing a great saving would be effected, as it would prevent the rapid destruction of such ships.

After reading the above paper, Mr. E. Hunt inquired whether I had made experiments to ascertain if the presence of caustic alkalies or their carbonates, when mixed with sugar, prevented the marked action of that substance on iron. Considering this a most important question to determine, as iron ships are rapidly destroyed when used for conveying sugar from the colonies to this country, I instituted the following series of experiments:

Blades of iron were partly immersed in a solution containing 10 per cent. of sugar, and in similar solutions to which had been added 2½ to 5 per cent. of caustic and carbonate of soda; after a month the same results were obtained with the saccharine as with the aqueous solutions. But as it would be impracticable to use solutions of caustic or carbonated alkalies in the holds of ships laden with sugar, I thought it therefore advisable to try what might be the influence of zinc, when attached to iron, in preventing its oxidation, and am glad to say that a piece of zinc covering about 1-15 part of the blade preserves the iron from rusting in that part of the blade immersed in the sugar solution. The use, therefore, of plates of zinc fixed on the sides of an iron vessel, or, perhaps better, the employment of galvanized iron plates in the construction of ships, deserves the attention of shipowners.—*Journal of the Society of Arts.*

* These results prove the statement of Bonsdorff (see Gmelin, vol. v., p. 185), that carbonic acid has no action on iron, is incorrect.

† The composition of the various deposits above described was not assumed, but was determined by careful analysis.

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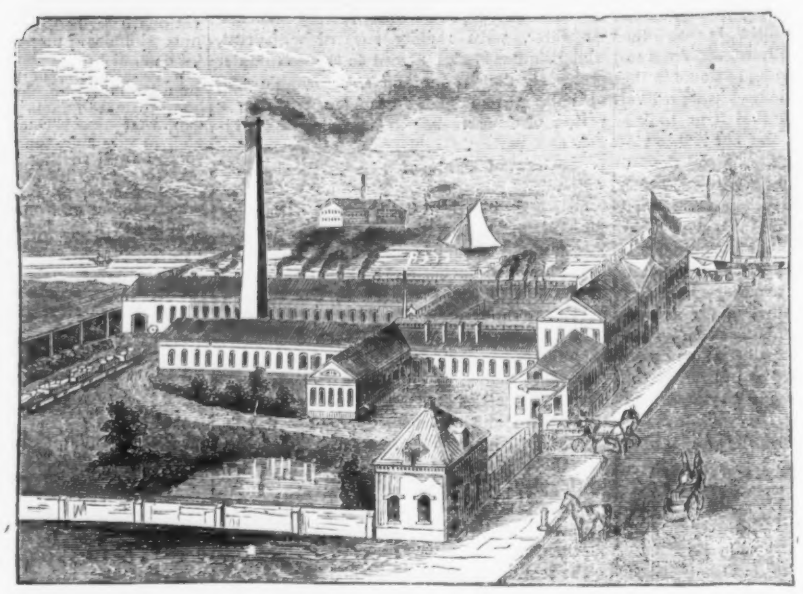

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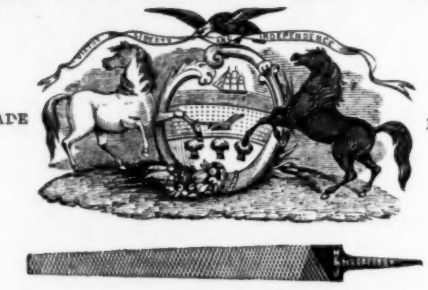
TRADE  MARK

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Fig. 1—Shows Hanger with the Projection (A) corresponding with the Brace (D) of the Rail.

Fig. 2—Shows the Rail with Double Brace (D and E).

Fig. 3—Shows Sheaf with Cas Axle (B) and Shoulder (C).

Figs. 4 and 5—Show chills used to chill the Axle (B) and its bearings.

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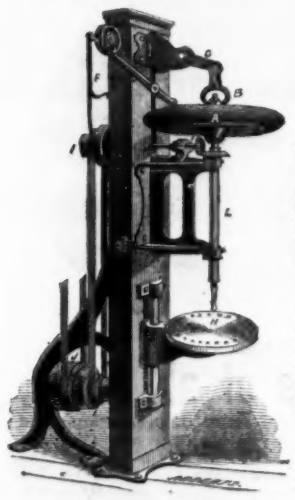

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BUSINESS ITEMS.

PENNSYLVANIA.

The second condenser, weighing 17 tons, for the steamship Pennsylvania, has been constructed at the Scott Foundry, Reading, and has been sent forward to Philadelphia. It was transported on the gun truck belonging to the Pennsylvania Railroad Company, which was specially built during the war for hauling 50-inch guns at Fort Pitt Foundry, Pittsburgh.

The Leesport Iron Company's furnace has been improved, and is now producing 238 tons of No. 1 iron, using 3800 lbs. of ore with 2000 lbs. of coal.

Moyes, Gardner & Co., of Pittsburgh, have received the contract from the Pittsburgh Gas Company to furnish them with a new tank, at a cost of $38,950. The contract for new gasometer was given to Morris, Tasker & Co., of Philadelphia, at a cost of $69,000. These were the lowest bids received.

The contract with Clark, Reeves & Co., for the erection of an iron bridge across the Schuylkill at Girard avenue, Philadelphia, and accepting the Phœnix Iron Company as security in the sum of $300,000 for the faithful performance of the contract, has been approved by council and the mayor.

The Wheatland rail mill has resumed work.

The capacity of the rolling mills of Pennsylvania is increasing very rapidly. The Pencoyd Iron Works of A. & P. Roberts & Co. are being doubled in capacity by the addition of a magnificent mill. The Phœnix Iron Company intend erecting a million dollar additional mill. Another is projected near Bridesburg, on the Delaware, just above Philadelphia, another at Wilmington, another at New Castle, and still another, with blast furnaces, at Delaware City, the future terminus of the Pennsylvania Central Railroad.

There is talk of building a new furnace at Mansfield next summer capable of turning out 40 tons of pig iron per day.

CONNECTICUT.

The Sheffield Manufacturing Company have completed their new foundry buildings and begun operations, though as yet with a limited number of hands. The cost of the buildings and machinery is about $30,000, and the capacity would enable from ten to fifteen tons of castings to be turned off daily.

A contract has been awarded the Winchester Arms Company to manufacture 200,000 of the Martini-Henry rifles for the Turkish government. The great similarity between this and the Peabody gun has caused an interference on the part of the Peabody Arms Company, of Providence, and a compromise between the two companies has just been effected. The barrel and bayonet are to be constructed by the Peabody Company, and the rest by the Winchester Arms Company. After the several parts have been completed the guns will be sent to the Providence Tool Company's shop at Providence. The contract for 110,000,000 cartridges, to be made with the arms, has been reserved by the Winchester Arms Company.

In Hartford, January 13, the Blackman Wheel Company was organized with a capital of $50,000. The following officers were elected: President, Enoch C. Roberts; secretary, H. I. Barber, Jr.; treasurer, Thomas Birch.

MICHIGAN.

At St. Albans, iron and steel works are being erected, in which there are to be 18 puddling furnaces, a 19-inch roll train, and a steam hammer weighing 3000 lbs. In the rail mill will be 10 heating furnaces and a 2-inch roll train. The mill is very favorably situated for obtaining cheap ore, coal, etc., and the transportation facilities are excellent. Silicon steel rails and various kinds of iron and steel will be manufactured.

The Marquette *Mining Journal* says that the Lake Superior Company's furnace, which is now going into blast, is one of the most complete in detail of any so far erected in this country, and by far the finest in the Lake Superior iron district.

WISCONSIN.

The Milwaukee Iron Company, of Milwaukee, will turn out this year fully $35,000 tons of railroad iron and 32,000 tons pig iron. They employ about 1000 men, and pay out every month from $70,000 to $75,000 for labor. The works will use this year 60,000 tons of soft coal, 20,000 tons of hard coal, 20,000 tons of coke, 25,000 tons of lime stone, and 70,000 tons of iron ore, about three-quarters of which is from Iron Ridge, forty-five miles from Milwaukee.

NEW JERSEY.

About 200 men are now employed by the McNab & Harlin Manufacturing Company, at Paterson, in the manufacture of all kinds of brass fittings for gas, steam and water pipes.

Juan G. Gibson, of Jersey City, has erected a new machine shop, and is largely engaged in building engines of various descriptions, and machinists' tools.

INDIANA.

The Terre Haute Car Works last year manufactured 850 railroad cars, valued at $600,000. The same works paid out for wages in that time about $89,000, and used in the work 5500 tons of cast and 1100 tons of wrought iron.

At Vincennes, a company has been organized for the purpose of erecting a rolling mill. The citizens are subscribing very liberally to the enterprise.

IOWA.

The Burlington Iron Works are working their entire force on Jackson's Scales and Hay's Electrical Boiler Protector.

The Murray Iron Works, Burlington, claims to be the largest foundry in Iowa. They are paying especial attention to railroad work.

MISSOURI.

A company has been formed, with $300,000 capital, to work at the Little Missouri coal mines, near Clayton, Brown county. The coal is easily mined, the vein being near the surface, and nearly three feet in thickness. In quality it is pronounced equal to the best Illinois coal. The company claim that they can deliver coal at Quincy at nine cents per bushel.

OHIO.

The Ohio Wrought Iron Fence Company, of Kenton, Hardin county, with a capital stock of $20,000, has filed a certificate of incorporation with the Secretary of State.

The Ætna Iron Works, Ironton, with a capital of $1,000,000, have elected the following Directors: George Willard, W. C. Amos, Thomas McGomey, Cyrus Ellison, Geo. N. Gray, O. T. Dean and D. H. Clark. They will begin work in their new furnace and mills immediately.

The Lawrence Iron Works, during the year 1872 just closed, have run altogether 481 "turns," running all the time on "double-turn" except during the last week, the mill being steadily employed during the whole year, except for a short time only in the summer. They have employed about 300 men at the mill and at their coal banks, and during the year have manufactured 7674 tons of muck bar, and 6914 tons of finished iron. They have paid for metal, $334,740·23; for ore, $24,300·17; for coal, $50,030·50; for labor at the mill and for repairs, $180,398·82; a total of expenses of $598,469·72.

J. Stonering & Co., of Cleveland, manufacture steam engines and machinery of every description. They have been established 21 months, and occupy a two-story building 24x80 feet. They employ 20 men and do a business of $2000 a month.

The foundry of Mears, Olhaber & Co., Ironton, will start to work, full handed, as soon as the river opens so that shipments of stocks can be made.

WEST VIRGINIA.

The preliminary surveys for the railroad bridge over the Ohio River, at Wheeling, have been completed. Estimated cost of bridge, $1,000,000.

KENTUCKY.

The Louisville *Commercial* states that the Adrin Furnace, in Muhlenburgh county, will shortly be put into operation, Gen. Buell having gained his suit in regard to the lease of the property, and formed a strong company of Eastern capitalists to operate the mines and works. The furnace was started just prior to the breaking out of the war, which compelled a suspension of operations, and but little ore was ever taken out. The engine on the place is a magnificent one, and has been kept in perfect order ever since is was put up. Nearly half a million dollars were expended in establishing these works. The ore is of a very fine quality, and exists in great quantities, and limitless beds of coal exist in the vicinity. The new company will soon proceed to develop this great wealth.

A new rolling mill at Paducah has commenced operations.

We learn from the Catasauqua *Dispatch*, that the Catasauqua Manufacturing Company have purchased for the Fern Dale Rolling Mill a tremendous hammer, which will strike a thirty ton blow. The hammer was manufactured in Philadelphia toward the close of the war, for the purpose of pounding out the sides of iron clad war vessels, but the discontinuance of the war before it was called into use, made it a sort of elephant on the government's hands. Since its construction, the mighty pounder has been lying idle at Bristol, Pa., and on Monday last Superintendent Hopkins, with a force of men, commenced the removal of the ponderous machine from the latter works. It will be a month before it can be properly located, when it will be used in making bar slabs, measuring 10, 12 and 14 inches in width. The new machine weighs about forty tons, and has the capacity of striking thirty tons weight. The hammer weighs three tons and has a fall of four feet. The machine is one which the company have long needed, and they can now fill orders more expeditiously.

An experiment was made recently on the Frankford branch of the Fifth and Sixth Streets Railway line, Philadelphia, with Lamm's fireless street locomotive, now in use on one of the street railways of New Orleans. The locomotive used weighed five tons; there were two cylinders six inches in diameter with a stroke of twelve inches, and the pinion wheel had twenty-eight teeth and the driver forty-six. The locomotive, with a car attached containing railroad officers and others, left the depot at twenty minutes of one o'clock with 176½ pounds pressure. The tracks were slippery with snow, but the engine carried the car up the heavy grades of the road and around the double curve at Adams street without any difficulty. After waiting about fifteen minutes at the Frankford terminus, the locomotive started on the return trip, arriving at the depot at twenty minutes of two o'clock. The distance traveled on the round trip was six miles and a quarter.

Mr. Leonard Myers, of Pennsylvania, introduced in the House of Representatives a bill to authorize the establishment of an ocean mail service between the United States and England, which proposes a fortnighly line of American-built iron steamers of not less than three thousand tons burden, to run between Philadelphia and Liverpool. It authorizes the Postmaster General to contract with the owners of the said line for carrying the mail at an annual compensation of not exceeding $156,000. The bill stipulates that the steamers shall be delivered to the government upon its demand, upon the payment of their full value to the owners, the value to be ascertained by appraisement. Referred to the Committee on Commerce.

A bill has been introduced in the Pennsylvania legislature authorizing the Thomas Iron Company to construct a railroad from their iron mines in Sussex to the Ogden Mine Railroad, with the privilege of connecting with any other road between the points named.

The Central, Colorado, *Register* reports that a vein of copper from 12 to 15 feet wide has been discovered on the Upper St. Vrain, in the Ward district.

Saws.

Keystone Saw, Tool, Steel & File W'ks,

Front & Laurel Sts., PHILADELPHIA, PA.

HENRY DISSTON & SONS,

having rebuilt that portion of their extensive Works destroyed by the conflagration of Nov. 15, 1872, and having introduced new and improved Machinery for the Manufacture of every Article of the Trade, are prepared, with their increased facilities, to fill all orders with punctuality, promptness and dispatch.

H. W. PEACE,

MANUFACTURER OF

SAWS OF ALL KINDS.

FACTORY, WILLIAMSBURGH, N. Y.

BOYNTON'S LIGHTNING SAWS.

Front Edge View showing two points of M tooth dressed to cut in line on one side, and two on the other.

WORKINGMAN'S TIME-SAVER,
With Frame, only $1.25 each.
"You See how it is Yourself."
Two Direct Cutting Edges,
instead of One Scraping Point.
The Greater includes the less.

The Lightning One Man Cross-Cut, for Cutting Wood, Joists, Logs and Timber, and Sawing Down Trees.

The Lightning Saw has been awarded the American Institute Medal, 1872.

The superiority of the Lightning Saw over all others is now established beyond dispute. No man has ventured to put his saws in competition with them at the American Institute or elsewhere; and the challenge of $500 for a public trial has never been accepted. Wherever power and speed are wanted—wherever time and strength are too valuable to be wasted, there these Saws will assert their claim. One source of their power is that the teeth are formed to cut both ways, and each tooth having two direct cutting edges instead of one scraping point, it plows a clean groove through the wood, while the other teeth only crush their way through under hard pressure.

Facts and opinions given by gentlemen of the highest character, from their own observation and experience, fully sustain all that can be said in praise of this Invention. J. W. BLAKE, Esq., Superintendent of the American Institute, writes: "For all purposes of cross cutting large or small timber, your cross cuts and wood saws have no rival in speed or ease. Their universal use would save a vast amount of money and time, and lighten the labor of millions of men."

At the Bedford Farmers' Club, at Katonah, January 26, 1872, a leading farmer of Westchester county said that he had used the Lightning Cross-Cut Saw the last year, and that two men could cut more wood with it in one day, than in three with any other saw.

A practical lumber man also writes: "It is as easy to cut 20 to 25 thousand feet with the Lightning Saw as 8 to 10 thousand with the old V tooth. We get 80 cents per thousand for cutting—so the difference would pay for a saw in less than one day's work.

The Lightning Saws are now in use and for sale in every State and Territory of the Union, and are sent to foreign lands; indeed to every quarter of the world. More than 100,000 purchasers during the year 1872 add their testimony to the claims of superiority of the Lightning Saws.

These Saws are of all sizes, from the fine hand-saw of one foot long, to the ten-feet California Cross-Cut. Two men can use the one-man Saw, by attaching one of Boynton's Patent Handles, removable at pleasure. Many imitations are abroad that are deficient in some essential features, and I am prosecuting infringers in the United States Courts. None are genuine unless they bear the name of E. M. BOYNTON, and the date of the four patents. Every such saw has been rigidly inspected before leaving the factory, and is warranted to coil to touch ends without injury. A six-feet Cross-cut and a Buck-saw blade will be sent for Six Dollars.

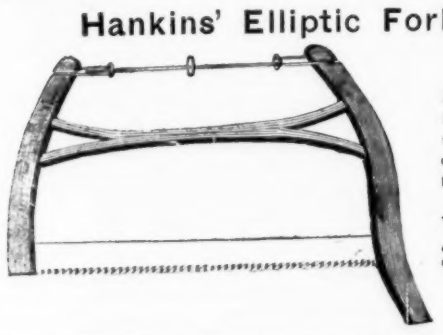
For Catalogue, Price List and additional information, please address

E. M. BOYNTON,

Sole Proprietor and Manufacturer, 80 Beekman St., New York.

Hankins' Elliptic Forked Saw Frame.

Patented June 28th, 1870.



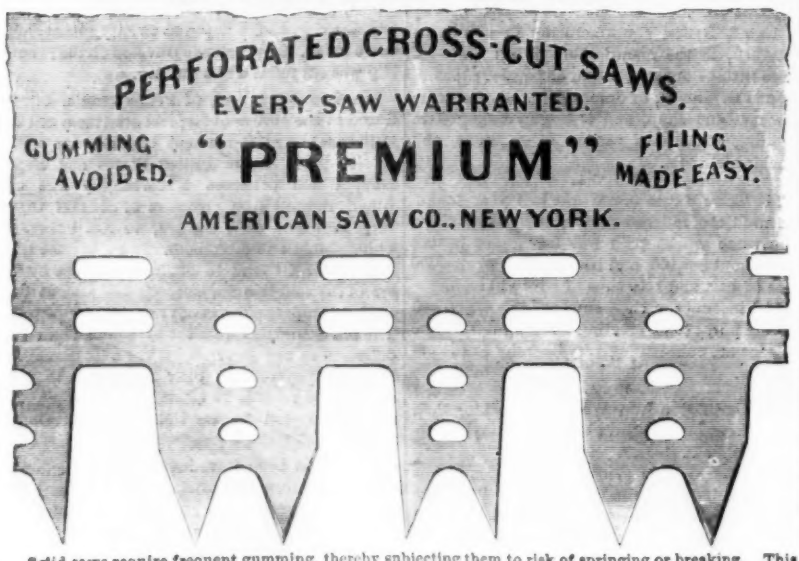
The annexed engraving represents HANKINS ELLIPTIC FORKED SAW FRAME, which commends itself to the trade for its simplicity of construction. The Forked Brace being all in one piece, without any centre bolt, secures for the Frame great strength and durability.

These Frames are put up with my best Webs, marked "No. 40, Harvey W. Peace.

HARVEY W. PEACE,
VULCAN SAW WORKS,
WILLIAMSBURGH, N. Y.

AMERICAN SAW CO.,

No. 1 FERRY STREET NEW YORK.



Solid saws require frequent gumming, thereby subjecting them to risk of springing or breaking. This is especially the case with cross cuts having *Patent Teeth*. In the perforated saws **all gumming is avoided,** and the teeth are easily kept long and in *proper shape*, saving *files, labor, expense* and *vexation*. As is well known, our saws cut faster, smoother and easier than any other.

MOVABLE-TOOTHED CIRCULAR SAWS AND SOLID SAWS OF ALL KINDS.

WOODROUGH & McPARLIN,

MANUFACTURERS OF

PATENT GROUND

SAWS

OF ALL KINDS, INCLUDING

HAND, PANEL, BACK SAWS, &c.

CINCINNATI, O.

SEND FOR A CATALOGUE.

J. FLINT & CO.,

Manufacturers of all kinds of SAWS and PLASTERING TROWELS.

ROCHESTER, N. Y.

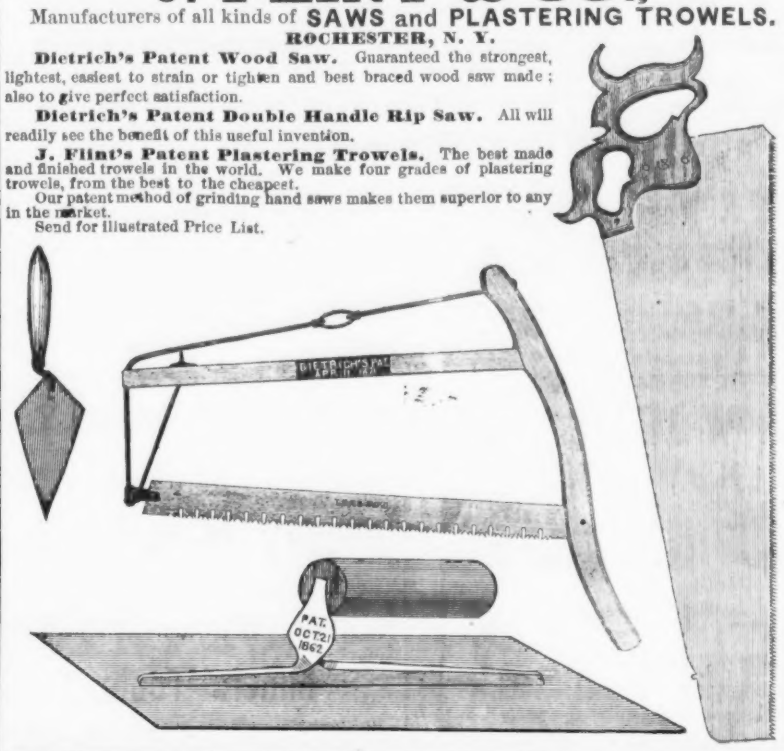
Dietrich's Patent Wood Saw. Guaranteed the strongest, lightest, easiest to strain or tighten and best braced wood saw made; also to give perfect satisfaction.

Dietrich's Patent Double Handle Rip Saw. All will readily see the benefit of this useful invention.

J. Flint's Patent Plastering Trowels. The best made and finished trowels in the world. We make four grades of plastering trowels, from the best to the cheapest.

Our patent method of grinding hand saws makes them superior to any in the market.

Send for illustrated Price List.



FRONT VIEW. BACK VIEW

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WHOLESALE

HARDWARE HOUSE,

AND

HARDWARE FACTORS.

BATES' MANUFACTURING CO.'S GOODS.

Bonney's Pat. Hollow Augers & Spoke Trimmers.
Bonney's Patent Double-Edged Spoke Shave.
Bonney's Patent Adjustable Gate Hinge.
Bonney's Patent Sash-Fast and Lamp Bracket.

625 Market Street,

PHILADELPHIA.

Do your own Printing with a **Novelty Printing Press,** the best yet invented for amateur and business purposes, and unsurpassed for general job printers. Over 8000 in use. **Benj. O. Woods,** Manufacturer and Dealer in every description of Printing Material, 349-351 *Federal* & 15½ *Kneeland St's., Boston. Branch Store,* 543 *Br'dw'y* & 88 *Mercer St., N. Y. Agents, Kelly, Howell & Ludwig, Philadelphia, J. F. Edwards, St. Louis, Mo., A. C. Kellogg, Chicago, Ill.* Send for a new Illustrated Pamphlet.

James M. Berry, Newmarket, N. H., Writes Nov. 25th, 1872.—I think the Novelty is the best press yet invented; I am certain that it can be worked at a much greater rate of speed and do better work than any other amateur press.

Wm. A. May, Chicago & Canada R. R. Co., Morenci, Mich., Writes Jan. 10th, 1873.—I have recently been doing some very fine work on my little Novelty, in fact, quite throwing the "regular" job offices in the shade.

T. J. Turley, Franklin, Tenn., Writes Nov. 6th, 1872.—Some months ago I purchased one of your Duodecimo Novelty Presses, and I am happy to say that it works admirably and far exceeds my most sanguine expectations in the manner it does its work.

A. S. K. Holbrook, Ogdensburg, N. Y., Writes Nov. 26, 1872.—My Novelty does work equal to that of the best offices in this city.

P. P. Mast & Co., Buckeye Agricultural Works, Springfield, Ohio, Write July 29th, 1872.—Our Novelty Press works to our entire satisfaction.

Oscar F. Black, Vergennes, Vt., Writes Dec. 16th, 1872.—My Novelty works splendidly.

F. H. Pinkham, New Market, N. H., Writes Aug. 9th, 1872.—I like my "Novelty" better and better every day; I am surprised at the speed with which I work it.

J. A. Morrill, Fulton, N. Y., Writes Nov. 25th, 1872.—The Duodecimo Novelty Press which I purchased about two weeks ago works splendidly; cards printed on it seem as fine as engraved.

Geo. W. Biehn, Ripley, O., Writes Sept. 16th, 1872.—I have given the Octavo Novelty Press, which I bought of you about one month ago, a fair test with a chase full of type, and I like it better than ever.

Excelsior Saw Works,

515 Cherry St., Philadelphia.

WM. McNIECE,

Manufacturer of

Superior Cast Steel Hand, Panel, Ripping, Ice, Compass, Hack, Butchers' Bow, Grafting, Pruning, Keyhole and Web Saws, Mowing Knives, Trunk Springs, And all other kinds of Springs, made from Sheet Cast Steel.

Especially adapted for the Iron and Metal Trades.

55 Beekman St., NEW YORK.

Send for Samples and Prices.

Saws.

WHEELER, MADDEN & CLEMSON

Manufacturers of Warranted Cast Steel

SAWS

OF EVERY DESCRIPTION,

including

Circular, Shingle, Cross Cut, Mill, Hand, Roberts' and other Wood Saws, &c., &c.

CAST STEEL FILES

of the well-known brand of

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Brundage Forged Horse Nails,

Manufactured from

BEST NORWAY IRON,

by BRUNDAGE & CO. Sold by

Wheeler Madden & Clemson,

MIDDLETOWN, ORANGE CO., N. Y.

LIVINGSTON'S

PATENT BRACED

WOOD SAWS,

Pat. BUTCHER & KITCHEN SAWS

Recognized Standard Goods for durability, quality and finish.

For sale by the Hardware Trade and

T. F. Cheritree & Co., New York.

We make a specialty of the LARGEST SIZES of **Circular Saws,** and call particular attention of lumber manufacturers to the following points of excellence

EVENNESS OF TEMPER.

The peculiar structure of our furnace subjects all parts of the saw to a DEAD heat, and when dipped in the oil bath secures perfect uniformity.

PERFECT ACCURACY IN THICKNESS.

Our saws are ground on a patent machine, automatic in its operation, grinding off the thick places upon the plate before the thinner parts are reached, and when the saw is removed BALANCES PERFECTLY, which is proof positive of the right accomplishment of the work.

PROPERLY HAMMERED.

Great care is taken that no saw shall leave our works without due attention in this important particular. A saw too tightly strained upon the rim, or too loose in the center, can not be successfully run—hence the importance of so hammering the saw as to effect equal strain in all its parts, and at the same time RUN TRUE. This department is under the personal supervision of our Senior, who has devoted over *twenty years* to the art of saw making.

We are sole proprietors and manufacturers of the celebrated **"Clipper" Cross-Cut Saw.** Price Lists of all kinds of saws sent on application.

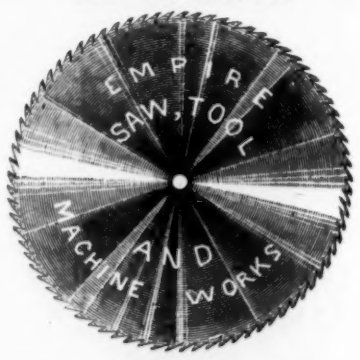
OHLEN & LANMAN.

Columbus, O.

SAMUEL R. KENNEDY. JAMES ECCLES.

Samuel R. Kennedy & Co.,

2423, 2425, 2427 Lombard Street, PHILADELPHIA, PA.



Manufacturers of

Saws of all kinds,

Including **Circular, Mill, Cross Cut, Hand, Panel, Rip, Back, Butcher and Compass, Turning, Felloe, Billet and Machine Webs. Also Shafting, Pulleys and Hangers, Lift and Force Pumps, Screw and Hydraulic Presses for Bookbinders and others. Saw Mandrels, Punches, Shears, &c.**

Our Saws are Beveled by the most improved Machinery known to the trade, and are fully warranted. Catalogues on application.

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MANUFACTURERS OF
TABLE CUTLERY
OF EVERY DESCRIPTION. ALSO,
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IN VERY GREAT VARIETY.
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HENRY DICKINSON,
Sheffield Cutlery, Files, &c.,
66 & 68 READE STREET (near Broadway), NEW YORK.
Manufactory, SHEFFIELD, ENGLAND.
Isaac Milner's Fine Pocket and Table Cutlery.
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Hargreaves, Smith & Co.'s "Imperial" Files.
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Notice of Removal.
ASLINE WARD,
From 54 Beekman St. to No. 101 and 103 Duane St., N. Y.
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GEO. WOSTENHOLM & SON
CUTLERY AND RAZORS,
WASHINGTON WORKS, SHEFFIELD.
CORPORATE MARK.
I·X·L
FRED'K WARD & CO., SHEFFIELD,
CUTLERY & TABLE KNIVES.
CORPORATE MARK.
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ENGLISH
HARDWARE.
WOSTENHOLM'S
IXL
POCKET KNIVES,
KNIVES & FORKS,
RAZORS,
SCISSORS, FILES, CHAINS,
ANVILS, VICES,
GUNS.
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CORPORATE MARK,
Joseph Rodgers & Sons'
(LIMITED)
CELEBRATED CUTLERY,
No. 82 Chambers Street, New York.
CHARLES PEACE, Jr., Agent.
The demand for Joseph Rodgers & Sons' productions having considerably increased, they have, in order to meet it, greatly extended their Manufacturing Premises and Steam Power.
To distinguish Articles of Joseph Rodgers & Sons' Manufacture, please to see that they bear their Corporate Mark.

JOSEPH S. FISHER,
No. 411 Commerce St., PHILADELPHIA,
AGENT FOR
George Wostenholm & Son,
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Celebrated I-XL Cutlery, Razors, &c

SOLE AGENT FOR THE UNITED STATES OF
WALTER SPENCER & CO.,
Steel and File Manufacturers,
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Corporate Mark.
SPENCER ROTHERHAM
Granted 1777.

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Hardware Commission Merchant,
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JOSEPH ELLIOT & SONS,
Manufacturers of Razors, Table Knives, &c.,
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ESTABLISHED 1852.
NEW YORK KNIFE CO.
MANUFACTURERS OF SUPERIOR
Table & Pocket Cutlery,
WARRANTED TO BE MADE OF THE BEST MATERIAL.
WALKILL RIVER WORKS,
Walden, Orange Co., New York.
THOS. J. BRADLEY, President.

The Miller Bros. Cutlery Company,
Manufacturers of Patent
FINE PEN AND POCKET CUTLERY,
WEST MERIDEN, CONN.
We warrant our Knives equal in cutting qualities and workmanship to any made. We also make
SILVER PLATED POCKET KNIVES,
which will not rust or become discolored when used as a Fruit Knife, and their cutting qualities are equal to any other Knife.
CLARK, WILSON & CO., Agents,
81 Beekman Street NEW YORK.

REMOVAL.
We have removed from No. 68 Beekman Street, to the new and commodious store, No. 101 & 103 Duane Street, near Broadway, where will be found our usual assortment
GUNS, PISTOLS, CUTLERY
FISHING TACKLE,
And Sporting Articles of every description.
Agents for
Alexander's Pocket Cutlery,
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★ Union Repeating Pistols,
W. & S. Horrabin, Sheffield, Eng. } Pocket Cutlery.
BARTON, ALEXANDER & WALLER
101 & 103 Duane St., New York.

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PYRAMID WORKS, Sheffield, Eng.
Manufacturers of Table Cutlery, Butcher Knives, Bread Knives, &c., by patent and Improved Machinery. Agents: U. S., Smith & Hall, 58 & 60 Reade St., N. Y.; Canada, Thos. Ellin & Co., Sheffield, Eng.

WALSH, COULTER & FLAGLER,
83 Chambers and 65 Reade Sts., New York,
AMERICAN AND FOREIGN
HARDWARE,
SOLE AGENTS FOR THE SALE OF
JOHN ROTHERY'S
CELEBRATED FILES.
Walden Co-operative Knife Co.
SUPERIOR POCKET CUTLERY.

The Family Cherry Stoner.

The only really practical cherry stoner ever made. It does its work perfectly, without mashing the fruit.
D. H. GOODELL, Sole Manufacturer,
Office & Salesroom, 55 Chambers St., N. Y.
Works at Antrim, N. H.
P. S. I am also sole manufacturer of *Turn Table* and *Lightning Apple Parers, Lightning Peach Parers* and *Climax Apple Corers.*

The Question of Fuel in Sheffield.

We take the following from the Sheffield *Telegraph* of Jan. 11th:

Since the opening of the New Year there has been a decided movement on the part of the coal agents in Sheffield for the purpose of increasing the price of fuel. The initiative was taken not so much by the leading firms, as by those who for the past few months have been undecisive as to whether to advance rates to the full market quotations. The result has been that prices of coal have become more firm, with a shorter supply, and there is a marked tendency upward. This has caused no small agitation in commercial circles, as owing to the peculiarities of local industries the consumption of coal is very large.

For a considerable time past the master steelmakers have been considering what methods might be best adopted in order to reduce rates, and the only plan which was thought feasible was that of working the plants half-time. Owing, however, to the inpouring of work during the past few days the scheme has been partially abandoned, as it is felt that though the drawbacks to business may be very great, on account of the dearness of both classes of fuel, yet the effect of a general, or even partial, lock-out would be tenfold more disastrous. Orders which have been accepted for iron have only been received on advanced terms, and there can be no doubt that, in the generality of instances, the converters of steel have secured further concessions, though not in proportion to the serious alterations which have taken place in the values of material, and which are greatly against manufacturers.

At a recent meeting of gentlemen engaged in the steel-trade, there was a prevailing opinion that a general lock-out of the men could not be thought of at present—such a movement being for the express purpose of reducing the demand for coke, and consequently materially affecting its market value. Neither was it deemed desirable to work the furnaces half-time, as the action, if taken, would only be partially joined in by the masters, as many of the principal firms were in possession of orders which rendered it imperative on their part to continue operations. Ultimately the meeting was adjourned, and the matter will again come on for consideration before a committee composed of the leading firms in the town.

The cutlery manufacturers are greatly inconvenienced through the prevailing price of coal used for steam purposes. They find it not only undesirable, but almost impossible to enhance the rates which they charge for "sidings" and "power," and though trade is so brisk, there is plenty of "room" to let at within a fraction of the rates which prevailed last year. The grinding-wheel proprietors are almost as awkwardly fixed. In the autumn months of last year they decided on imposing an extra fee upon the tenants of each trough, and rents were raised, though not to any considerable degree. At the same time certain restrictions were resolved upon as to the supply of coal to the grinders whilst at work. It has since been found that even upon these extra terms it does not pay to let troughs. Should the price of coal still further increase, the difficulties of the manufacturers and power proprietors will be much greater, as they will have to contend against two evils—first, the enhancing value of fuel, and, secondly, the necessity of raising "rents" generally throughout the trades—a task simple in proposition but very difficult of accomplishment. The impositions of the coal proprietors are looked upon with great disfavor by commercial men in the town, and it is feared that should the policy of the former be pushed too far there will be a sudden relapse. The manufacturers are united in the opinion that some measures ought to be taken for the protection of their position, but they are undecided as to what course ought to be adopted under the circumstances.

The following quotations will give an idea of the prices which are being paid. On the wharf or at the yard:—Duke of Norfolk's collieries: Silkstone coal—branch, 21s.; picked hards, 19s. 2d.; house coal, 17s. 11d.; nuts, 15s. Parkgate coal: nuts, 17s. 6d.; laggins, 16s. 8d. For the best varieties from the neighborhood of Barnsley the prices are: Best picked hard coal, 24s.; best laggins, 20s., house coal, 19s.; seconds, 17s. 6d.; screened nuts, 14s. 6d.; engine slack, 13s. The agents of the collieries between here and Doncaster quote: Best screened house coal, 19s.; ordinary house coal, 17s. 6d.; engine slack, 13s.

Our Barnsley correspondent writes that there seems to be great divergence of opinion as to the prices charged by South Yorkshire proprietors, but that no increase of price has been made for two months past at the Oaks colliery, nor at any of the leading collieries in the Barnsley district. As a rule, the price of steam coal in South Yorkshire has not advanced one penny during the past two months.

Freaks of Electricity.

Mr. C. H. Simmons, electrician to the Western Union Telegraph Company, writes as follows concerning the electrical phenomena of the great storm of the 7th and 8th of January:

The recent storm which passed over the West and Northwest was accompanied by some very peculiar electrical phenomena, rarely seen east of the great prairies leading to the Rocky Mountains. This phenomena may be called an electrical storm, in contradistinction to the auroral or magnetic storms—the former being confined to a comparatively small space, beyond which the state of the electricity in the atmosphere remains unchanged, while the latter manifests itself over whole continents simultaneously, while evolving light by the action of magnetic forces. The area in which this electrical display was confined was plainly marked, having Minnesota for its north boundary, Southern Iowa for the south, Detroit for the east, and Omaha for the west limit. It was first noticed on the telegraph wires in Central Iowa on the afternoon of January 7, at 2:25 p. m. The lines leading west were rendered useless for the transmission of messages, owing to an incessant discharge of electricity, increasing in intensity until it would leap from one strap of the switch-board to another, across the intervening space, and then in a luminous stream to the ground plate of the lightning arrester. At times the whole brass work of the switch board would appear as a mass of flame, illuminating the office with a blinding glare. The excellent arrangement with which every office is provided for discharging the lightning from the iron during the frequent thunder-storms of the Western plains, proved adequate for the discharge in this case, although in intensity and volume much greater than ever before witnessed. For several hours previous, and for some time after the cessation of these electrical discharges, a south-west wind was blowing, at a speed of thirty-five miles per hour, accompanied by light snow, with the thermometer at five degrees. At 6:45 p. m. the electrical storm had reached the Mississippi River, traveling eastward, producing similar effects to those noted in Central Iowa. At about 9:30 p. m. light discharges from the western wires were observed in the Chicago office, but it was evident that these came from a distance, and that the storm had not traveled far east of the Mississippi. These continued at intervals during the night of the 7th and until the evening of the 8th, when the discharges became more rapid and of exceedingly high tension. When the batteries were taken off and both ends of the line left open, if the finger of an individual standing upon the floor was presented in proximity to the wire, an immediate discharge took place in the form of a spark, and when a number joined hands and insulated themselves from the floor a spark could be drawn from any of them by any one standing on the floor. It was now evident that the storm had reached this locality, and it was ascertained that it had entirely ceased west of the Mississippi River. Observation disclosed the fact that, with two or three exceptions, the effect was confined to wires running almost due east and west, the exception being on wires running due north from Chicago, on which but little interference was noticed.

Another singular fact observed was, on some routes, where a number of wires occupied the same poles, one wire alone was highly charged, and so affected that to work it was an impossibility, while all the others were entirely free from any external influence. In some cases the wire occupying the top of the pole would apparently receive the whole charge; in other cases the bottom wire would receive it, and still in others the charge seemed to be divided equally between all the wires. In the Chicago office the effect was similar to that observed in Iowa, and every observation confirmed the opinion that the center line of the storm was due east from Des Moines, Iowa, to Detroit, Mich., narrowing in its limits north and south as it approached the latter place, where it arrived on the evening of the 8th inst., and rapidly subsided. A high wind, varying from 28 to 25 miles per hour, with the same range of temperature as first noted, accompanied the electrical storm from its inception in the West until it had passed Chicago, where the weather was clear and bright, but the wind still blowing a gale. This display was observed by a large number of operators and practical telegraph men, and all accord in saying that its effects were entirely different from those experienced during the ordinary auroral storms with which they are familiar.

At the eastern slope of the Rocky Mountains a similar phenomenon has been frequently witnessed upon a wire running north and south, but rarely on an east or west wire. As a high wind always prevails when the effect is experienced, many telegraph experts have attributed it to the friction of the wind, but this theory does not appear tenable, from the fact that we so frequently have the wind without the electric charge. That the electricity evolved by various processes accumulates in the atmosphere, and varies in condition and intensity, is universally admitted, and that it is stronger in winter than in summer has been abundantly proved. Sir William Thomson has shown, by experiments with the electrometer, that during a wind the air is charged very intensely positive. Now, upon the theory that the earth is charged negative to the atmosphere, there must be a point at the surface of the earth where discharge occurs or neutralization takes place. At points where the relative humidity of the air is very great, this is, doubtless, ever silently going on; but during seasons of intense cold, when the air is necessarily dry, the combination is evidently rendered more difficult, and the tension thereby greatly augmented. If, under these circumstances, good conductors, such as telegraph wires, are interposed, they would certainly assist in carrying a good part of the atmospheric charge to a point where the electrical tension was far less.

What the electrical condition of the telegraph wires on the same poles were, to render one more susceptible of this inductive influence than another, is difficult to determine. Or why wires running in other than east and west directions should not have been similarly affected, is a problem we shall call on our meteorological friends to assist in solving. It is a fact, however, that their resistance and insulation, as measured and adopted as a standard of excellence in propagating the electrical current of the ordinary voltaic battery, did not assist in the least in forming a theory. Should a recurrent storm pass over this latitude, it is hoped that more accurate and systematic observations will be made and a possible solution result.

R. Bett's large foundry at Logan, Ohio, was partially destroyed by fire on the evening of January 26th; loss $5000.

Mineral Deposits in the Upper Peninsula of Michigan.

It has been asserted, from time to time, that the section of country on the south side of Lake Superior, laying between Marquette and the Pictured Rocks, contains deposits of bog ore. Dr. Rominger, who is attached to the geological survey of the State of Michigan, has been examining that region south and east of Marquette county, and with commendable caution speaks as follows of the bog ore deposits he saw:

Among the more recent superficial deposits the bog iron ores are of high practical interest. A number of localities in which bog iron ore was found were long since pointed out in the maps of the linear surveyor of the State. In the late preliminary report of the former State Geologist, inexhaustible quantities of this ore were said to exist on the western tributaries of the Manistique and of Taquamenon Rivers, and for that reason I have given particular attention to the investigation of these districts.

Nearly all of the springs contain small quantities of iron in solution, which they deposit, if by escape of carbonic acid, or by other chemical action the solvent power of the water for the iron should fail. The waters of all the rivers of the Peninsula are freed of the iron which they hold in solution, by passing through the extended swamps, from which the rivers originate, and the small continuous secretion of iron particles, in favorable spots, gradually increases to masses of such extent as to constitute valuable ores for the manufacture of iron. Such large deposits are, however, of rare occurrence. Usually we find the surface coated with a crust of ochraceous mud, or the superficial sand is infiltrated and sometimes cemented into a hard sandstone band by the ferruginous matter or concretiary lumps and nodoles of a purer hard ore, sprinkled thinly over the ground, and frequently adheres to the root fibers of fallen trees. Spots of this kind, noticed by the woodman and the surveyors, have been carefully indicated in the maps, and seem to show that the whole center of the peninsula is carpeted with bog iron ore. Only in very few places the ore deposits are important enough to give favorable hope for mining operations.

Among all the bog iron ore deposits which came under my observation, I found one of the best localities on the head waters of the Taquamenon River, which I am going to describe. Between the head waters of Two Hearted River and the west branches of Taquamenon River a swampy, almost treeless, high plateau spreads out, on which for many square miles, not a trace of bog iron is to be seen, until finally, at the southeast margin of it, the stagnant ditches of the plain collect into a tortuous channel with slow current, which, before it enters the timbered lands, is surrounded by a grassy marsh, about 60 acres in extent. Over this spot the bog iron is dispersed in small irregular patches, which are clear of all vegetation excepting a few low bushes. The total of the surface occupied by the ore can be estimated to be three acres; the greatest observed thickness was 15 inches, but in other places it was not more than two inches, and its average thickness I would not estimate over six inches. Beyond these limits no more ore is found in this locality.

The ore is evidently of a rich quality, but I have not found the time yet to make an accurate chemical analysis of it. Numerous other localities for bog iron which I saw were of no greater extent than the described deposit, and most of them much inferior to it. Also, the frequent descriptions of bog ore deposits given to me by the woodsmen did not indicate the existence of any more favorable spots for ore in this district.

Taking into consideration the remoteness of these places from all passable roads, and the easy exhaustibility of such limited areas, I am of the opinion that at present little practical benefit can be derived from these mineral stores, which perhaps in the future may become valuable, after the country gets more inhabitants, and is traversed by railroads, or even only by common roads.

There are immense iron mines, or mountains in Nevada, which it is said will probably at some future day furnish all of that metal required for use on the Pacific coast. A party has recently discovered an immense deposit which is said to be 70 per cent. pure iron. The croppings are 100 feet wide, and it is found on both sides of the hill which contains it. Wood and water are plenty, and limestone is within convenient distance. The copper mines are again receiving some attention, and if the operations now being carried on under the direction of G. F. Deetken, a practical metallurgist, prove successful, there will be a revival of that business.

Certain experiments recently conducted with dynamite, in France, lead to the conclusion that the condition under which this explosive is employed exercises a most important effect upon its value as an explosive agent in engineering. These experiments indicated that when the match entered deeply into the cartridge, the dynamite simply burned without explosion. It was further observed that when the match but slightly entered the cartridge, the explosion was in all respects satisfactory, and that nothing was left to be desired when the cartridge was primed with fulminating mercury.

Maranzoni and Stefanelli have discovered that a film of an essential oil on the zinc plates of a voltaic pile has an effect similar to that of amalgamation, preventing local action to a certain extent. It diminishes the quantity and intensity of the current at the commencement of the action, rendering it for a certain time more constant, but stopping it entirely after two or three hours. In like manner the evolution of hydrogen by the action of zinc on dilute sulphuric acid is quickly arrested by the addition of an essential oil, but is recommenced on adding alcohol.

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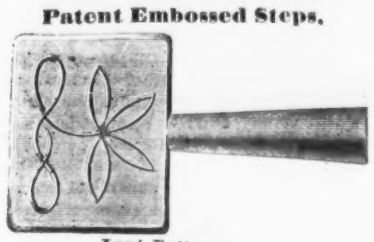


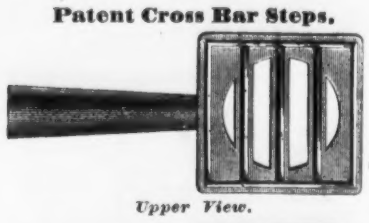
Leaf Pattern.

King Bolt Yokes.

No. 6 Fifth Wheels.

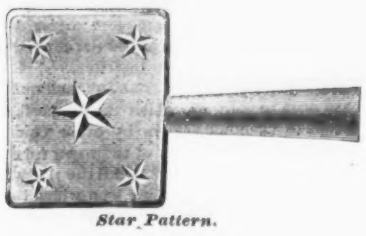
1871 Pattern Shaft Couplings.

Patent Cross Bar Steps.



Upper View.

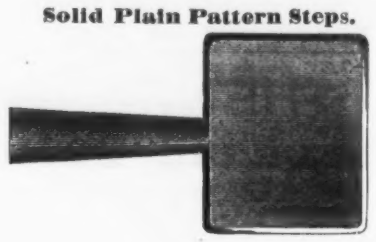
Lower View.



Star Pattern.

Smith's Improved Philadelphia Pattern Slat Irons.

Solid Plain Pattern Steps.



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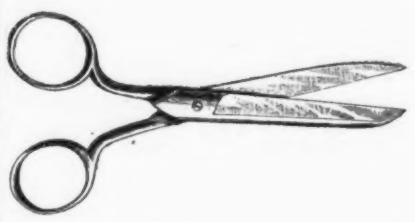

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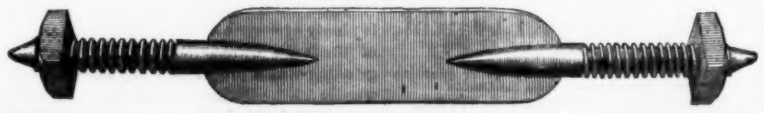

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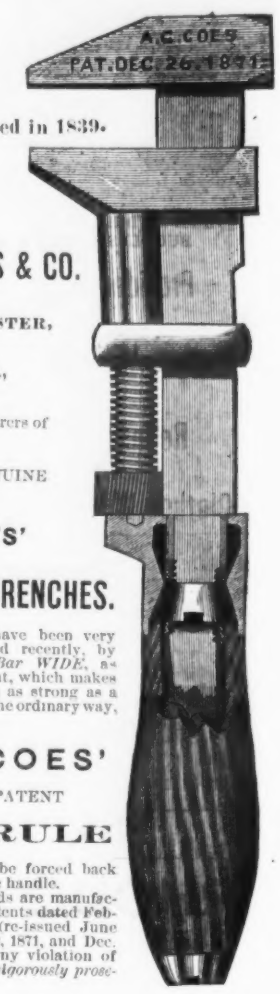
Henshall James, 1056 Beach, Phila.....35
Taws & Hartman, 1235 N. Front, Phila.....34
Engines, Steam, *Makers of.*
Fishkill Landing Mch. Co., Fishkill-on-the-Hudson, N. Y.....24
Utica Steam Engine Co., Utica, N. Y.....35
Wright J. W. 112 Spruce, Phila.....35
Whitehill, Smith & Co., Newburg, N. Y.....29
Engines, Portable, *Makers of.*
Hoadley J. C. & Co., Lawrence, Mass.....34
Engravers, *Wood.*
Tuttle D. H., 5 Beekman, N. Y.....14
White H. R., 52 John, N. Y. 33
Faucets, *Self Measuring, Makers of.*
Enterprise Mfg. Co., of Pa., Phila. and N. Y.....30
Files, *Importers of.*
Carr J. & Riley, 82 John, N. Y.....32
Dickinson Henry, 66 and 68 Reade, N. Y.....11
Fisher Joseph S., 411 Commerce, Phila.....11
Moss F. W., 80 John, N. Y.....32
Sanderson Bros. & Co., 16 Cliff, N. Y.....32
Spear & Jackson, 98 Chambers N Y.....26
Files, *Manufacturers of.*
Barnett G. & H., 41 and 43 Richmond, Phila..... 8
McCaffrey & Bro., 1732 & 1734 N. 4th, Phila..... 8
Nicholson File Co., Providence, R. I..... 8
Rothery John & William, 83 Chambers N Y....11
Wheeler, Clemson & Co., Middletown, N. Y.....11
Fire Arms, *Manufacturers of*
Remington E. & Sons, Ilion, N. Y..... 7
Schoverling & Daly, 84 Chambers, N. Y..... 7
Great Western Gun Works, Pittsburgh..... 7
Parker Bros., West Meriden, Conn..... 7
Fire Brick, *Importers of.*
Hammill & Gillespie, 240 and 242 Front, N. Y... 6
Fire Brick, *Makers of.*
Bowman O. O. & Co., Trenton, N. J..... 6
Evens & Howard, 916 Market, St. Louis, Mo.....
Hall A. & Sons, Perth Amboy, N. J..... 6
Kreischer B., 58 Goerck, N. Y..... 6
Newkumet Philip, 23d and Vine, Phila..... 6
Palmer, Newton & Co., Albany, N. Y..... 6
Watson John R., Perth Amboy, N. J..... 6
Fire Department Supplies, *Mfr. of.*
Allen Albert F., Providence, R. I..... 9
Felting, Salamander, *Manufacturers of.*
U. S. & Foreign Sal. Felting Co., Troy, N. Y.....35
Gage Cocks & Damper Regulators.
Murrill & Keizer, Baltimore, Md.....35
Galvanized Iron.
Lefferts Marshall Jr., 94 Beekman, N. Y.. 4
Gate Hinges, self closing, *Makers of.*
Clark & Co., Buffalo, N. Y.....36
Glass, *Importers of.*
Downing A. C. & Co., 57 Beekman, N. Y 13
Governors, *Makers of.*
Lynde J. D., Philadelphia, Pa..... 35
Grindstones.
McDermott J. & Co., Cleveland, O.....33
Wood Walter R. & Co., 283 and 285 Front, N. Y..33
Grist Mills (portable), *Makers of.*
Leonard & Silliman, Bridgeport, Conn.....39
Gunpowder, *Makers of.*
Kneeland F. L. (Dupont) 70 Wall, N. Y.....32
Laflin & Rand Powder Co., 21 Park Row, N. Y..32
Hammers, etc., *Manufacturers of.*
Industry Mfg. Co., 76 Reade, N. Y..... 9
Nelson Tool Works, 157 E. 32d, N. Y..... 9
Handles, *Makers of.*
Smith, J. W. H & Co., Charlotte, Mich.....8
Hardware Auctioneer.
R. T. Hazell & Co., 118 Chambers, N. Y.....15
Hardware, *Brass and Galvanized.*
Tiebout W. & J., 290 Pearl, N. Y..... 2
Hardware, Commission Merchants.
Fernald & Sise, 31 Beekman, N. Y..... 8
Gerzabek O. V., San Francisco, Cal..... 8
Green R. M. & Co., 100 Chambers, N. Y.....12
Graham & Haines, 88 Chambers, N. Y.....30
Halsey J. E., 76 Reade, N. Y..... 8
Jewett & Roberts, 102 Chambers, N. Y.....
Stevens N. B. & Co., Boston..... 7
Walbridge Geo. B., 55 Chambers, N. Y.....26
Hardware Dealers.
Brower J. I. & Co., 288 Greenwich, N. Y.....12
Finney Tho's I. & Co., Vicksburg, Miss.....29
Hubbard & Curtiss Mfg. Co., 82 Chambers, N.Y..25
Lloyd, Supplee & Walton, 625 Market, Phila.....26
Shepard Sidney & Co., Buffalo, N. Y.....30
Turner, Seymour & Judds, 64 Duane, N. Y..... 8
Walsh, Coulter & Flagler, 83 Chambers, N Y....10
Hardware Importers.
Beam & Murray, 54 Cliff, N. Y..... 26
Boker Hermann & Co., 101 Duane, N.Y.....26
Field Alfred & Co., 47 John, N. Y. 25
King H. & J. W., 80 Chambers, N. Y.....11
E. Frith, 16 Cliff, N. Y.....25
Van Wart & McCoy, 43 Chambers, N. Y.....25
Turnor R. A., 37 Chambers, N. Y.....11
Wiebusch F. H., 84 Chambers, N. Y.....26
Hardware Manufacturers.
Biddle Mfg. Co., 78 Chambers, N. Y.....26
Enterprise Mfg. Co., Phila.....30
Hart, Bliven & Mead Mfg. Co., 243 Pearl, N. Y..30
Hubbard & Curtiss Mfg. Co., 82 Chambers, N. Y..25
Kellogg Wm. P. & Co., Troy, N. Y..... 7
Lane, Gale & Co., Troy, N. Y..... 8
Many F. L. & Marshall, 48 Warren, N. Y..... 9
Middletown Tool Co., 82 Chambers, N. Y.....24
Miller's Falls Mfg. Co., 78 Beekman, N. Y.....25
Moorhead, Adams & Co., Pittsburgh, Pa.....36
Pratt & Co., Buffalo, N. Y.....26
Providence Tool Co., 11 Warren, N. Y 14
Ripley Mfg. Co., Unionville, Conn.....32
Russell & Erwin Mfg Co., 45 Chambers, N. Y..... 8
Skinner & Cooley, Watkins, N. Y..... 8
Shattuck W. F. & Co., 113 Chambers, N. Y.....14
Stanley Works, 58 Beekman, N. Y.....26
Taylor Mfg. Co., New Britain, Conn.....25
Union Mfg. Co., 55 Chambers, N. Y.....32
Williams, White & Churchill, 73 Warren, N. Y... 8
Wilson Mfg Co., 87 Chambers, N. Y..... 12
Hardware Specialties.
Biddle Mfg. Co., 78 Chambers, N. Y..... 9
Semple, Birge & Co., St. Louis..... 36
Hoes, Makers of.
Peters Bros., Mfg. Co., Marshall, Mich.....14
Hoisting Engines, *Makers of.*
Morris Co. Mch. and Iron Co., 36 Cortlandt, N.Y..34
Otis Bros. & Co., 348 Broadway, N. Y..... 9
Horse Nails, *Makers of.*
Ausable Horse Nail Co., 35 Chambers, N. Y.....36
Brundage & Co., Middletown, N. Y.....11
Globe Nail Co., Boston, Mass.....36
Pratt & Co., Buffalo, N. Y.....26
Horse Shoes, *Makers of.*
Burden Iron Works, Troy, N. Y..... 6
Hubs and Spokes, *Mfrs. of.*
Gleason, J., 2nd & Diamond, Phila.....12
Insurance, Boiler.
Hartford Steam Boiler and Inspection Co.....28
Iron Brokers.
Boynton Geo. A., 70 Wall, N. Y..... 2
Hazard & Jones, 212 Pearl, N Y..... 4
Petit Wm. H., 72 Wall, N. Y..... 4
Iron, Charcoal, *Warm or cold blast.*
Quincy John W., 98 William, N. Y..... 4
Iron Commission Merchants.
Hand Jas. C. & Co., 614 & 616 Market, Phila.....15
Malin Bros., 228 Dock, Phila..... 6
Iron, Pig, *Importers of.*
Williamson James & Co., 69 Wall, N. Y..... 4
Iron Dealers.
Abeel Brothers, 190 South, N. Y..... 4
Bigelow & Johnson, 48 Pine, N. Y..... 4
Bonnell, Botsford & Co., Youngstown, O..... 4
Borden & Lovell, 70 & 71 West, N. Y..... 4
Buchanan Geo., 19 Birchin Lane, London, E. C.. 6
Cleveland Brown & Co., Cleveland, O..... 6
Coddington T. B. & Co., 25 Cliff, N. Y..... 4
Conklin & Buerstel, 99 Market Slip, N. Y..... 4
Davidge & Wheeler, 785 Pine, N. Y..... 4
Fuller, Lord & Co., 139 Greenwich, N. Y..... 4
Fuller, Dana & Fitz, 110 North, Boston..... 2
Gardner Wm., 575 Grand, N. Y..... 4
Hall, Kimbark & Co., Chicago..... 6
Harrison & Gilloon, 558 to 562 Water, N. Y..... 4
Jackson & Chase, 206 and 208 Franklin, N. Y.... 4
Judson B. F., 457 and 459 Water, N. Y..... 4
Matthews Chas. W., 133 Walnut, Phila..... 6
Packard, Goff & Co., Youngstown, O..... 2
Piersons & Co., 24 Broadway, N. Y..... 4
Pope Thos. J. & Bro., 292 Pearl, N. Y..... 6
Richards D. W. & Co., 92 Mangin St., N. Y..... 4
Swan John E. & Bros., Glasgow, Scotland..... 6
Smith Gam'l G. & Co., 342 Pearl, N. Y..... 4
Warner A. B. & Son, 28 & 29 West, N. Y..... 4

Williamson James & Co., 69 Wall, N. Y..... 4
Whitney Alfred R., 58 Hudson, N. Y..... 4
Iron, *Manufacturers of.*
Atwater, Wheeler & Co., New Haven, Conn..... 6
Burden Iron Works, Troy, N. Y..... 6
Cartwright, McCurdy & Co., Cleveland, O..... 6
Cleveland Rolling Mill Co., Cleveland, O..... 6
Coffin Wm. E. & Co., 8 Oliver, Boston..... 4
Elizabeth Iron Co., Elizabethport, N. J..... 6
Ellis W. R. & Co., 17 Batterymarch, Boston..... 4
Everson, Graff & Macrum, Pittsburgh, Pa..... 4
Fulton, S. & Co., 412 Walnut, Phila..... 6
Jones & Laughlins, Pittsburgh, Pa..... 4
Leonard John, 450 & 451 West St., N. Y..... 4
Milwaukee Iron Co., Milwaukee Wis..... 4
Niles Iron Co., Niles, O..... 6
New Haven Rolling Mill Co., New Haven, Ct..... 4
Old Dominion Iron and Nail Works Co., Richmond, Va..... 6
Oxford Iron Co., 81 Washington N. Y..... 4
Phœnix Iron Co., 410 Walnut, Phila..... 6
Rowland, Wm. & Harvey, Phila.....36
Iron, Hoop, *Manufacturers of.*
Wm. Clark & Co., Pittsburgh, Pa..... 4
Iron, Sheet, *Manufacturers of.*
Reese & Co., Pittsburgh, Pa..... 4
Iron, Swedish, *Importers of.*
Jessop Wm. & Sons, 91 and 93 John, N. Y..... 32
Mitander Nils, 69 William, N. Y..... 4
Page Ewd. & Co., Boston, N. Y. and Phila..... 4
Lace Leather, *Manufacturers of.*
Coupe Wm. & Co., S. Attleboro' Mass.....12
Williams J. H. & N. A., Utica, N. Y.....12
Lanterns, *Manufacturers of.*
Howard & Morse, 45 Fulton, N. Y..... 2
Taylor Mfg. Co., New Britain, Conn.....25
Lawn Mowers, *Manufacturers of.*
Chadborn & Coldwell Mfg. Co., Newburgh, N. Y. 29
Hill's Archimedean Lawn Mower Co., Hartford, Ct.....15
Lead and Tin Lined Lead Pipe, etc, *Mfrs.*
Colwell, Shaw & W. Mfg. Co., 213 Centre, N. Y.. 2
Locks, *Manufacturers of.*
Norwich Lock Co., Norwich, N. Y.....15
Romer & Co., Newark, N. J..... 24
Sargent & Greenleaf, 55 Chambers, N. Y.....26
Trenton Lock Co., 48 Warren, N. Y..... 9
Yale Lock Mfg Co., 1 Barclay, N. Y.....26
Machinery, *Makers of.*
Fishkill Landing Mch. Co., 63 Bleecker, N. Y.. 24
Greene D. A., 326 & 328 Delancy, N. Y.....34
Mason V. W. & Co., Providence, R. I.....35
Morris Co. Machine and Iron Co., Dover, N. J...24
Chapin Machine Co., New Hartford, Conn.....34
Pratt & Whitney Co., Hartford, Conn.....34
Stiles & Parker Press Co., Middletown, Ct.....35
Watson Andrew, 537 Dickinson, Phila.....35
Machine Screws, *Makers of*
Lyons & Fellows Mfg, Co., Williamsburg, N. Y..24
Machinists' Tools, *Makers of.*
Blaisdell P. & Co., Worcester, Mass.....35
Harrington Edwin, 15th St., & Pa. Ave., Phila....35
Malleable Iron Castings, *Makers of.*
Barnett Oscar., Newark, N. J..... 8
Tower Daniel L., Elizabethport, N. J..... 6
Meat Cutters, *Makers of.*
Whittemore D. H., Worcester, Mass.....28
Metal Dealers and Brokers.
Belknap Aug., 60 Beekman, N. Y..... 2
Crane C. O., 104 John, N. Y..... 2
Coddington T. B. & Co., 25 & 27 Cliff, N. Y..... 2
Harnickell Max, 85 Beaver, N. Y..... 2
Phelps, Dodge & Co., Cliff, N. Y..... 2
Pope Thos. J. & Bro., 292 Pearl, N. Y..... 2
Quincy J. W., 98 William, N. Y..... 2
Thomson A. A. & Co., 213 and 215 Water, N. Y.. 2
Van Wart & McCoy, 43 Chambers N. Y..... 2
Metallurgists.
Britton J. Blodgett, 339 Walnut, Phila.....14
Drown & Corliss, 1123 Girard, Phila.....14
Eliot Boyd, 31 Beach, N. Y.....14
Henderson James, 30 Broadway, N. Y.....14
Maynard & Van Rensselaer, 24 Cliff, N. Y.....14
School of Mines, E. 49, N. Y..... 14
Mining and Railroad Tools, &c., *Makers of.*
Washoe Tool Mfg. Co., 61 Park Place, N. Y.... 9
Molder's Tools.
Carter H. & Sons, 290 Pearl, N. Y.....36
Mower and Reaper Knives, *Makers of.*
Simond's Mfg. Co., Fitchbury, Mass.....12
Monuments, *Granite and Bronze*
National Fine Art Foundry, 218 E. 25th..... ... 6
Nickel Platers.
Smith L. L. & J. T., 133 & 135 W. 25th St., N. Y..14
Smith L. A., 42 Mechanic St., Newark, N. J.....14
Norway Shapes, *Rollers of*
Rowland Wm. & Harvey, 948 Beach, Phila.....36
Note Broker.
Gallaudet P. W., 3 and 5 Wall N. Y..... 2
Nuts, Bolts, *etc., Makers of.*
Ætna Nut Co., Southington, Conn.....14
Am. Rolled Nut & Tube Co., Richmond, Va.....15
Arms, Bell & Co., Youngstown, O.....14
Clark Bros & Co., Millidale, Conn.....12
Fuller, Lord & Co. Boonton, N. J..... 4
Haskell W. H. & Co., Pawtucket, R. I.....14
Lewis, Oliver & Phillips, Pittsburgh, and N. Y..14
N. Y. Screw Bolt Works, Ave. D & 11th, N. Y...14
Plumb, Burdict & Barnard, Buffalo, N. Y.....36
Rhode Island Nut Co., 11 Warren, N. Y.....14
Sternbergh J. H., Reading, Pa.....14
Oilers, Makers of.
White J. H., Newark, N. J.....36
Ore Crushing Machinery, *Makers of.*
Blake Crusher Co.....34
Paints and Oils, *Dealers in.*
Devoe F. W. & Co., 117 Fulton, N. Y.....
N. Y. Enamel Palut Co., 43 Chambers, N. Y.....29
Paper Dealers.
Hard Melvin & Son, 44 Beekman, N. Y.....25
Patent Solicitors.
Howson & Son, Phila., and Washington, D. C...29
Whitney J. A., 128 Broadway, N. Y.....29
Picture Nails, etc., *Manufacturers of.*
Richards T. C. & Co., 47 Murray, N. Y..... 2
Pipes, Fittings, *etc., Makers of.*
Eaton & Cole, 58 John, N. Y..... 30
McNab & Harlin Mfg. Co., 56 John, N. Y.....30
Nelson, Finkel & Co., 439 E. 10th St., N. Y.....30
Pancoast & Maule, 227 Pear, Phila.....30
Chas. Gregg Mfg. Co., 62 & 64 Gold, N. Y.....30
Washington Pipe Works, Boston.....30
Pipe, Water and Gas, *Makers of.*
Brick R. A. & Co., 89 White, N. Y..... 6
Graff William & Co., Pittsburgh, Pa.....30
Starr Jesse W. & Sons, Camden, N. J..... 6
Warren Foundry & Mch. Co., Phillipsburg, N. J..30
Wood R. D. & Co., 173 Broadway, N. Y..... 4
Plane Irons, *Manufacturers of.*
Middletown Tool Co., Middletown, Conn.....24
Sandusky Tool Co., Sandusky, O.....30
Planes, *Manufacturers of.*
Sandusky Tool Co., Sandusky, O.....30
Stanley Rule & Level Co., 55 Chambers, N. Y....14
Plumbago Lubricator.
N. Y. Black Lead Works, 172 Forsyth, N. Y.....
Plumbers' Materials, *Manufacturers of.*
Carr Wm. S. & Co., 106 Centre, N. Y.....30
Presses, Power, *Makers of.*
The Stiles & Parker Press Co., Middletown, Ct..35
Pressure Blowers, *Makers of.*
Sturtevant B. F., 72 Sudbury, Boston.....35
Printing Presses, *Makers of.*
Woods Benj. O., 351 Federal, Boston.....10
Printers' and Engravers' Depot.
Vanderburgh, Wells & Co., 110 Fulton, N. Y....35
Publishers.
Burr & Hyde, Hartford, Conn.....24
Pumps, *Makers of.*
Blatchley C. G., 506 Commerce, Phila.....15
Douglas W. & B., Middletown, Conn.....15
Rumsey & Co., Seneca Falls, N. Y.....15
Union Mfg. Co., 55 Chambers, N. Y.....15
Valley Mch. Co., Easthampton, Mass.....15
Rails, *Importers of.*
Congreve Chas. & Son, 104 and 106 John, N. Y..32
Hopkins S. W. & Co., 57 Broadway, N. Y..... 4
Naylor & Co., 99 John, N. Y..... 4
Smith Gilead A. & Co., 62 Broadway, N. Y..... 4
Rails, Iron or Steel, *Makers of.*
Atkins Bros., Pottsville, Pa..... 6
Cambria Iron Co., Johnstown, Pa..... 6
Cleveland Rolling Mill Co., Cleveland, O..... 6
Griswold John A. & Co., Troy, N. Y.....33
Springfield Iron Co., Springfield, Ills..... 6
Joliet Iron & Steel Co., Joliet, Ills..... 6
Razor Scraps, *Makers of.*
B. F. Badger, 51 Elm, Charlestown, Mass.....30
Rock Drills, *Makers of.*
Burleigh Rock Drill Co., Fitchburg, Mass.....34
Rolling Mill Machinery, *&c., Manufacturers of.*
Moore James, Cor. 16th & Buttonwood, Phila....34
Rolls, Chilled and Sand, *Makers of.*
Garrison A. & Co., Pittsburgh, Pa..... 4

Sash Balances, *Makers of.*
Anderson Balance Mfg. Co., Pittsburgh.....32
Sash Locks, *Makers of.*
Clark & Co., Buffalo, N. Y..... 36
Saws, *Makers of.*
American Saw Co., 1 Ferry, N. Y..... 10
Boynton E M., 80 Beekman, N. Y..... 10
Cheritree T. F. & Co, N. Y..... 10
Flint J., Rochester, N. Y. 10
Disston Henry & Sons..... 10
Kennedy S. R. & Co., 3423 Lombard, Phila.....10
McNeice Wm., 515 Cherry, Phila... 10
Ohlen & Lanman, Columbus, O..... 10
Peace Harvey W., Williamsburg, N. Y..... 10
Spear & Jackson, 98 Chambers, N. Y.....36
Wheeler, Madden & Clemson Middletown N.Y...10
Woodrough & McParlin.....10
Saw Frames, Wood, *Makers of.*
Peace Harvey W., Williamsburg, N. Y.....10
Scales, *Manufacturers of.*
Fairbanks E. & T. & Co., 311 Broadway, N. Y...15
National Scale Co., 206 River, Troy.....36
Riehle Bros., 9th near Coates, Phila.....36
Shattuck W. F. & Co., 113 Chambers, N. Y.....14
Scissors, *Manufacturers of.*
U. S. Steel Shear Co., W. Meriden, Ct 12
Screws, *Makers of.*
Miles F. S., 205 Quarry, Phila..... 26
Silks, *Makers of.*
Cheney Bros., Hartford, Conn.....13
Smelting Works.
Du Plaine & Reeves, 760 S. Broad, Phila.....36
Stamped Tin Ware, *Makers of*
Farrington J. D., Jr., 38 Murray, N. Y..... 8
Steam Hammers, etc., *Makers of.*
Dudgeon Richard, 24 Columbia, N. Y..... 35
Ferris & Miles, 24th and Wood, Phila.....35
Stone Tools, *Manufacturers of.*
H. M. Chase, Worcester, Mass 9
H. H. Harvey & Co., Augusta, Me..... 9
Snaps, Harness, *Makers of.*
Middletown Tool Co., Middletown, Conn..... 24
Spool Lifters, *Makers of.*
Chapin Machine Co., New Hartford, Conn.....35
Sporting Goods, *Dealers in.*
Barton, Alexander & Waller, 101 Duane, N. Y.....11
Squares, Steel and Iron *Makers of.*
Hart, Bliven & Mead Mfg. Co., 243 Pearl, N. Y...32
Steam Pumps, etc., *Manufacturers of.*
Woodward Steam Pump Co., 76 Centre, N. Y.....15
Steam Traps, *Manufacturers of.*
Fullerton & Hollingshead, Camden, N. J.....35
Steel Importers.
Carr J. & Riley, 82 John, N. Y.....32
Cocker Bros., Sheffield, Eng.....32
Congreve Chas. & Son, 104 and 106 John. N. Y...32
Hobson Francis & Son, 97 John, N. Y.....32
Jessop Wm. & Sons, 91 and 93 John, N. Y.....32
Moss F. W., 80 John, N. Y.....32
Piersons & Co., 24 Broadway, N. Y..... 4
Sanderson Bros. & Co., 16 Cliff, N. Y.....32
Sanderson Geo. & Co., 96 John, N. Y.....32
Van Wart & McCoy, 43 Chambers, N. Y.....32
Wardlow S. & C., 13 Gold, N. Y.....32
W. Hawksworth, Ellison & Co., 72 John, N. Y...32
Steel Manufacturers.
Anderson & Woods, Pittsburgh.....33
Chrome Steel Co., Brooklyn, E. D.....33
Cleveland Rolling Mill Co., Cleveland, O..... 6
Griswold John A. & Co., Troy, N. Y.....33
Hussey, Wells & Co. Pittsburgh.....33
Miller, Barr & Parkin, Pittsburgh.....32
New Jersey Steel and Iron Co., Trenton, N. J...33
Reese, Graff & Co., Pittsburgh 33
Rowland Wm. & Harvey, 948 Beach, Phila.....36
Singer, Nimick & Co., Pittsburgh.....32
Stove Boards, *Manufacturers of.*
Shepard Sidney & Co., Buffalo, N. Y.....25
Stove Polish. *Makers of.*
Joseph Dixon Crucible Co., Jersey City, N. J....36
"Gem" Stove Polish, 172 Forsyth, N. Y.....
Twist Drills, *Makers of.*
Morse Twist Drill & M. Co., N. Bedford, Mass. ..35
Tackle Blocks, *Makers of.*
Burr & Co. 31 Peck Slip, N. Y..... 8
Tin Ware, *Manufacturers of.*
Shepard Sidney & Co., Buffalo, N. Y.....32
Tacks.
American Tack Co., 117 Chambers, N. Y..... 24
Grundy Geo. C., 12 Platt, N. Y.....24
Dunbar, Hobart & Whidden, S. Abington, Mass..24
Field A. & Sons, Taunton, Mass.....24
Loring Samuel, Plymouth, Mass.....24
Tags, Waterproof, *Makers of.*
Schencks, 55 Beekman, N. Y..... 10
Tea Trays, *Importers of.*
Dickinson Henry, 66 and 68 Reade, N. Y.....11
Tinmen's Tools and Machines, *Makers of.*
Brombacher Charles, Tarrytown, N.Y..... 9
Peck, Stow & Wilcox Co., 97 Chambers, N. Y...26
Trowels, etc., Makers of.
Ross Wm. & Bros., 36th & Filbert, W. Phila ...30
Turbine Water Wheels. *Manufacturers of.*
Capron Water Wheel Co., Hudson, N. Y.....39
Swain Turbine Co., Lowell, Mass 39
Whitehill, Smith & Co., Newburg, N. Y.....39
Tubes, Wrought and Galvanized. *Manufacturers of.*
Griffith I. J. & Bros., Philadelphia, Pa.....30
Vises.
Backus Vise Co., 78 Beekman, N. Y.....25
Fisher & Norris, Trenton, N. J.....25
Howard Iron Works, Buffalo, N. Y.....25
Wilson Mfg. Co., 37 Chambers, N. Y.....25
White Lead, *Manufacturers of.*
Brooklyn White Lead Co., 89 Maiden L., N. Y...39
Colgate Robert & Co., 287 Pearl, N. Y.....29
Cornell Lead Co., Buffalo, N. Y.....29
Jewett John & Sons, 182 Front, N. Y.....29
Lewis John T. & Bros., 231 S. Front. Phila., Pa..29
Union White Lead Co., 26 Burling Slip, N. Y....29
Wire, *Manufacturers of.*
Gilbert, Bennett & Co., 273 Pearl, N. Y..... 2
New Haven Wire Co., New Haven, Conn..... 4
Parker Sam'l & Co., Wethersfield, Ct..... 2
Philadelphia Wire Works, N. 5th, Phila..... 2
Townsend W. P. & Co., Pittsburgh, Pa..... 2
Washburn & Moen Mfg Co., Worcester Mass.... 2
Wire Goods, *Manufacturers of*
Corning Jasper E., 58 Cliff, N. Y..... 2
Gilbert, Bennett & Co., 273 Pearl, N. Y..... 2
Howard & Morse, 45 Fulton, N. Y..... 2
Wire Rope, *Iron and Steel, Makers of.*
Roebling's John A. Sons, Trenton, N J..... 2
Wrenches, *Manufacturers of.*
Coes A. G. & Co., Worcester, Mass.....13
Philadelphia Tool Co., Phila.....24
Wrought Iron Goods, *Maker of.*
Maguire Jas. T., 115 Chambers, N. Y..... 4
Wire, *Importers of.*
Field Alfred & Co., 47 John, N. Y..... 2

Hardware.



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A. G. COES'

NEW PATENT

FERRULE

Which cannot be forced back into the handle.

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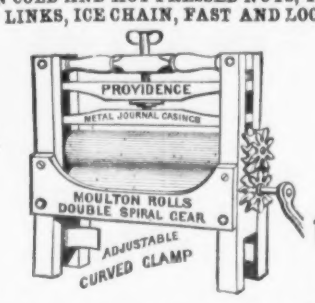

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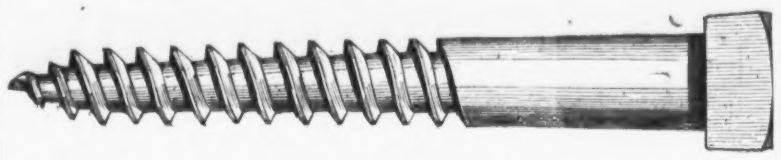

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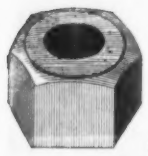

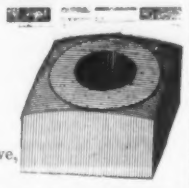

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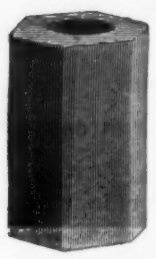

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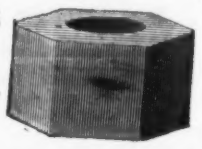

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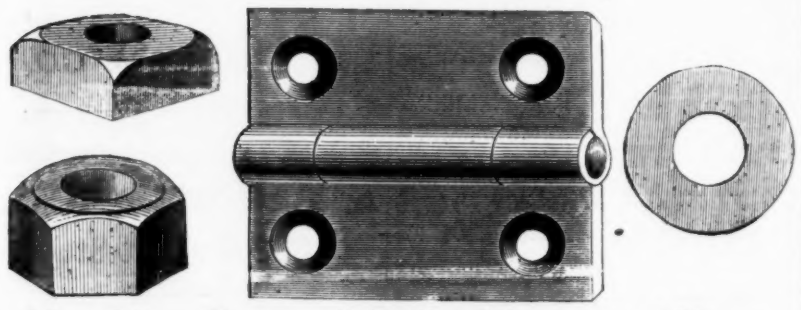

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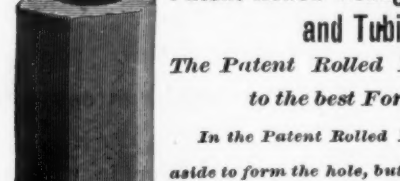

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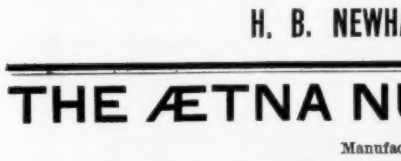

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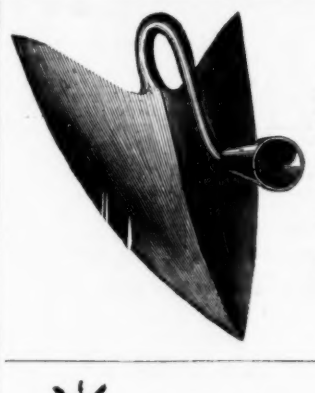

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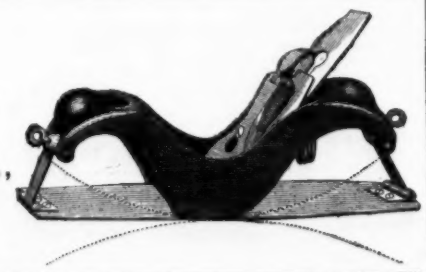

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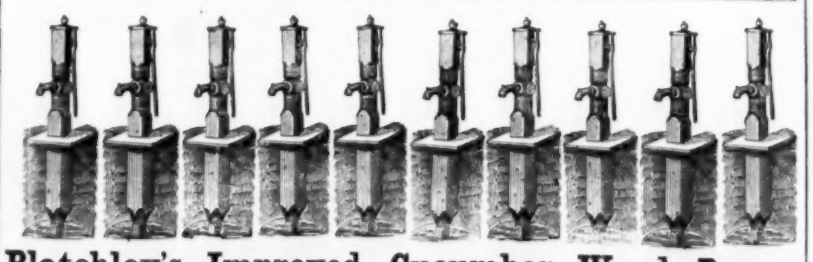

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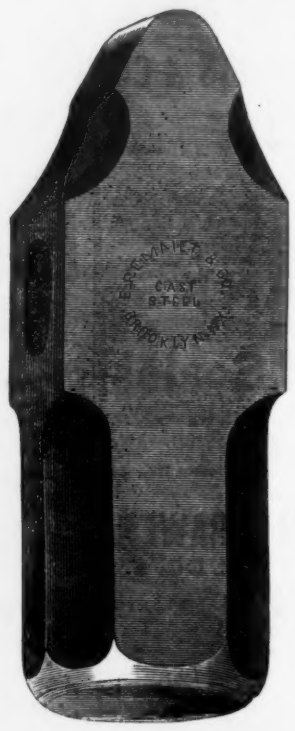

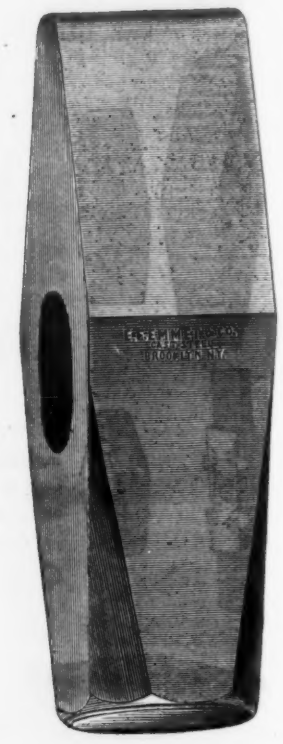

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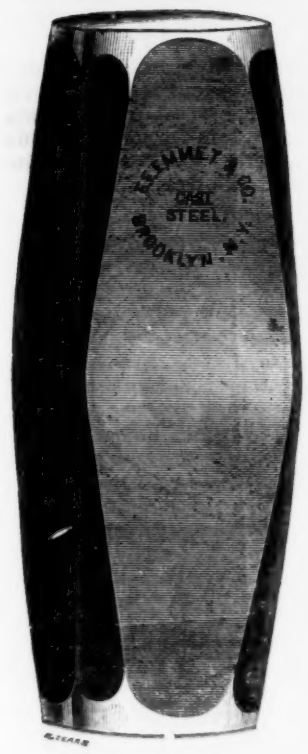

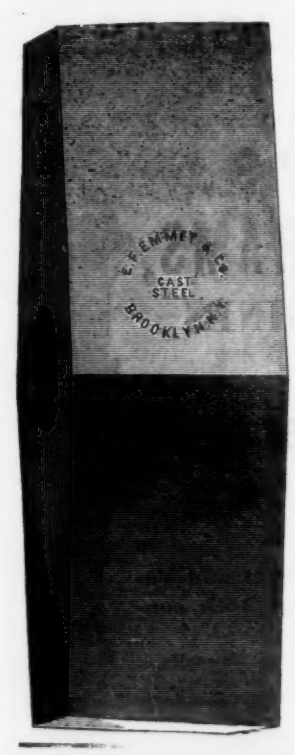

THE METAL TRADES.

Annual Review for 1872.

COPPER.

The year has been remarkable for the extraordinary speculation in Copper, in the month of April, surpassing in eccentricity of movement even the advance in July, 1864, when, simultaneously, the gold premium reached its hight at this financial center. In a great measure local, and of a speculative nature, the rise in the spring was contemporaneous with advancing markets all over the world, and obtained its main stimulus from Valparaiso, where the charters effected for England gave the key-note to the London excitement. The industrial development in the civilized world at large; the substitution of Copper vacuum pans for iron ones in the sugar countries, and many other unexpected uses of the metal, recently introduced; the enormous consumptive demand for many purposes, added to a lessened production on the West coast, and the diminished purchasing power of the circulating medium, caused a well-founded, natural rebound from a comparatively moderate ruling ever since the year 1866. It is also natural that speculators should have taken advantage of the condition of the market to force up prices. As for the general tendency of Copper, it is, with rising wages in older communities, and an expanding trade, unmistakably upward. Political and monetary impediments may stay, or, indeed, reverse it for a time, but it will make further headway until production on the one hand and consumptive capacity on the other shall counterbalance each other, and restore the natural level.

The year opened with comparatively light stocks, and a good deal of strength abroad, at 27¼c. for Lake Copper, closing on the last Thursday of January at 28¼c., the sales amounting to some 300,000 pounds. February kept steady, some further improvement being made, while the sales reached but 2,000,000 pounds, prices closing at 28½c. @ 28¾c.

In March the speculative combination that was to carry Lake to 45c. on the 11th of the ensuing month, was forming, and all measures were taken, not only for controling the available supply, but getting well in hand the future supply of the leading Lake companies all the way into the early fall months—some 8,000,000 pounds—the large manufacturers co-operating in the gigantic operation. After all these preparatory steps had been taken, and the foreign markets were steadily working in the same direction of a general upward movement in the metal, the mine was sprung upon the "short" operators by a further concerted purchase, in lots, of stray parcels that had been withheld, summing up another half a million pounds, and a series of "future" operations, securing for the three summer months some additional 5,000,000 pounds; the price for cash Copper in larger lots ruling 32½c. at the time, to rise to 33½c. and 34c. toward the close of the month.

The climax, as stated before, was attained in April, but prices having run wild, the intrinsic value of Copper had been lost sight of altogether, and, for the time being, had no bearing upon the market value of the staple, being of practical interest only to the "paper" speculators concerned and the few consumers who, in a small way, were still forced into the market.

The adjusting influence of a check by importation was soon felt in the market, although the price of Lake was kept to 42c. @ 43c. during the last week of the month. A large lot was simultaneously unloaded upon the market, about half a million pounds, and the corner was practically broken, a similar quantity of English being gradually distributed to consumption at from 36¼c. @ 33¼c.

In May prices began to settle down to a normal basis, some 600,000 pounds Lake and English selling at 33½ and 35, the latter subsequently even going at 32½c., to slightly recover upon favorable European news. In "futures" a million and a quarter pounds sold from 35c. down to 32½c., the month closing for cash Lake at 33c. @ 32½c.

In June the cash dealings were only moderate in extent, considering the restoration of a normal value—amounting to but a million pounds. For future delivery they were more extensive, ranging into early fall to the amount of about three million pounds, at 33c.@ 34½c., the month closing at 34c. Best Selected English had been ruling 32½c. @ 33c. the greater part of the month.

The warm and dull season now supervening, great stagnation began to prevail during the months of July and August, prices fluctuating very little. Lake was quoted at 33c. @ 33½c. on the last Thursday of July and 33½c. on the same day in August. Best Selected English had been all along keeping steady at 33c., and futures at 34c. in July, and at 33⅝c. in August.

A partial demoralization now took hold of the English market, which, during September, suddenly collapsed, reacting upon the foreign metal in our own market, Best Selected receding first to 32½, and subsequently to 31½c. English "afloats" even went begging at 30c., currency. The Lake market, so far as possible, cut loose from the market for foreign, and remained steady at the close at 33c. @ 34¼c.

During the month of October the decline in prices continued, Lake falling to 32c. and English to 28½c. At the close of the month Lake stood 32c. @ 32¼c. In November the course of the trade was still more in favor of buyers, a great many courageous holders being compelled to sacrifice their stocks in anticipation of a threatened monetary stringency on both sides of the ocean. Lake dropped to 30½c., but rallied to 30¾c. @ 31c., January, February, and March deliveries selling at 31¾c. @ 32c. Best Selected English had gone down to 27½c., but recovered to 28c. @ 28½c., upon receipt of more favorable advices from England and Valparaiso.

During the last half of the year the trade in Copper, as in other metals, was largely influenced by the changing conditions of the home and foreign money markets. For a time serious fears were entertained, especially in London, that the so-called "foundation mania," at Vienna, Berlin, and all over Central Europe, was about to collapse in a general crash. Soon, however, two important discoveries were made: the one, that the specie drain in the leading bullion and specie marts was merely of a temporary nature, and, to a large extent, manipulated, though in reality arising from the French indemnity payments; and the other that, for all legitimate trade purposes, there was an abundance of money in the open market, if not at bank. This more reasonable view beginning to prevail, and the fancied bursting of the "foundation bubble" not taking place, a general loosening of the purse-strings followed, and had, as is always the case, the most immediately beneficial effect upon the great metals, and especially Copper, all the easier placed into a tight corner, as the drafts drawn at Valparaiso against shipments are at 60 and 90 days' sight, instead of 6 months.

The effect of this improvement immediately communicated itself to our market, which was now fully prepared for a healthy reaction. The market here had remained dull up to the middle of December, Lake keeping steady at 30½c. @ 31c., on sales of half a million pounds, when a jump replaced it at 32c., and a gradual rise at 33½c., with "future" sales to an equal amount between 32c. and 34c., another 500,000 pounds English selling between 28c. @ 29c.

The following shows the Copper movement in the United States for the years 1871 and 1872:

1872.	Lbs.
Stock of Ingot Copper Dec. 31st, 1871	5,000,000
AMERICAN PRODUCTION DURING 1872.	
Lake Superior	25,324,000
Tennessee	1,250,000
Other places	2,750 000
Total production for 1872	29,324,000
English Copper imported during 1872	6,000,000
Total	40,324,000
Deduct stock on hand Dec. 31, 1872	5,000,000
Consumption during 1872	35,324,000
1871.	
Stock Dec. 31, 1870	10,700,000
Total American production	27,003,000
Total	37,000,000
Deduct stock Dec. 31, 1871	5,000,000
Consumption during 1871	32,700,000

The following shows the Copper production and movement in the Lake Superior district for the year ended December 1st, 1872:

PORTAGE LAKE DISTRICT,	Tons.	Lbs.
Calumet & Hecla (about)	9,800	
Quincy	1,397	1,949
Franklin and Pewabic	630	
Houghton (11 months)	300	
Schoolcraft (10 months)	287	370
Isle Royale	81	
Concord (about)	84	
Hancock	96	
Other sources	6	
Total	12,612	319
Product in 1871	12,744	1,906
Decrease in 1872	132	1,587
KEWEENAW POINT DISTRICT.	Tons.	Lbs.
Central	724	160
Phœnix	477	
Copper Falls	433	987
Delaware	110	161
Cliff	74	1,087
St. Clair	13	353
Petherick	6	146
Other sources	8	
Total	1,836	814
Product in 1871	2 340	1,391
Decrease in 1872	504	497
ONTONAGON DISTRICT.	Tons.	Lbs.
Ridge, Minnesota, National, and others	725	1,080
Product in 1871	990	1,446
Decrease in 1872	265	446
RECAPITULATION.		
Houghton county	12,612	319
Keweenaw county	1,836	894
Ontonagon county	725	1,000
Total	15,174	213
Total in 1871	16,076	743
Decrease in 1872	902	530

THE COPPER MOVEMENT AT BRITISH PORTS.

According to the official tables, the movement of copper in the United Kingdom was as follows in 1870, 1871, and 1872:

	1872. Tons.	1871. Tons.	1870. Tons.
Imports of bars, ores and regulus, &c.	76,937	60,308	61,027
Exports of all sorts	41,134	49,569	45,582

The imports and deliveries of Chili bars, &c., at Swansea and Liverpool, were as follows:

	Dec., '72. Tons.	Dec., '71. Tons.	Dec. '70. Tons.
Imports	3,100	2,700	2,100
Deliveries	2,300	4,700	1,750

There were afloat from Chili and on hand at London, Liverpool, Swansea, and Havre, of English and foreign copper, bars, &c.:

	1 Jan., '73. Tons.	1 Jan., '72. Tons.	1 Jan., '71. Tons.
Stock	32,378	18,054	35,739
Afloat from Chili and chartered	9,900	12,000	11,600
	42,278	30,054	47,339

Exports from Chili of bars, ores, regulus and fine copper during the first 10 months of 1870, and 1871 and 1872:

1872. Tons.	1871. Tons.	1870. Tons.
39,600	31,550	4..500

COPPER QUOTATIONS AT LONDON.

	1 Jan., '73. Per ton.	1 Jan., '72. Per ton.	1 Jan., '71. Per ton.
Tough	£96	£91	£70. 10/
Chili Bars	91	85	64. 10/
	Per unit.	Per unit.	Per unit.
Ores and Regulus	18/	17/	12. 6

MOVEMENT OF COPPER AT HAVRE IN 1872.

We take the following from the annual circular of L. Fleury, of Havre, published under date of December 31st, 1872.

With the sole exception of the first quarter of the year, the French copper trade has been dull as regards Chili, the stock of which had run unprecedentedly low. So far as American copper is concerned, the year has been a blank, there having been neither arrivals nor dealings.

The price of ingot at the opening of the year was 215 francs. In June it had advanced to 280 f. @ 285 f., receding to 240 f. in October, and recovering to 235 f., the closing price.

The high prices ruling in the French market toward midsummer caused considerable shipments from Japan, but supplies were steadily drawn from England. The following shows the movement of copper at Havre for the year:

IMPORT—1872.

From Chili.—44,515 Bars; 32,873 of which came direct; 7650 Ingots, and 131,604 bags Copper ore.

N. B.—It should be here remarked that large ingots and ore shipments are made from Chili, on through bills of lading to Liverpool, by steamers from Valparaiso *via* Bordeaux, through the Straits of Magellan, and that it is impossible to find out precisely what portion of them may be or may have been for French account, sales in transit at Liverpool being of frequent occurrence.

From various sources—4585 boxes and casks, and 198,000 kilos Old Copper, not counting sheet.

STOCK, DEC. 31st, 1872.

Chili Bars, 248 tons; Chili Ore, 580 tons; Other sorts, 650 tons; total, 1478 tons, equal to 1365 tons pure Copper; against Nov. 30, 1872, 910 tons, and against Dec. 31, 1871, 4470 tons.

The movement of other metals was as follows:

IMPORTS AT HAVRE, 1872.

Lead	Pigs.	107,590
Lead, old	Kilos.	4,800
Spelter, slabs	Tons.	2,640
Spelter, old	Kilos.	67,000
Tin, casks		130
Tin, slabs		24,089

SHEATHING COPPER.—While sharing in the general improvement in the early spring, Sheathing Copper kept steady during the last eight months of the year at 43c. In January quotations ranged between 31c. and 33c.; in February, advancing to 36.; in March reaching 38c., and in April touching 46c.

BRONZE AND YELLOW METAL SHEATHING followed more closely the fluctuations in Ingot. At the close of March the price was 26c. During the next four months the price ruled 30c., and during the last quarter kept steady at 27c.

YELLOW METAL BOLTS AND BRAZIERS.—The following shows the ruling quotations during the last week of each month: January, 36c. @ 37c.; February, 38c.; March, 40c.; April, 48c.; May, June and July, 45c.; August and September, 35c.; October, November and December, 45c.

YELLOW METAL NAILS opened at 26c. in January, reached 38c. in April, fluctuated between 30c. and 32c. in May, kept steady at 32c. until October, when they declined to 30c., advancing again to 32c., at which price they were kept until the end of the year.

Tin and Tin Plates.

Annual Review of the Tin Market in 1872.

The value of Tin being determined mainly by the production of the Dutch East India islands, and controlled, for this reason, by the individually wealthiest capitalists of Europe, seldom fluctuates as widely as other metals. If in holding Tin throughout a twelve-month, or a number of years, the Dutch capitalist realizes 5 per cent. per annum upon his investment, he is satisfied. This explains, to some extent, the comparatively slight fluctuations to which, up to within the last five years, this metal was subjected. Gradually, however, consumption has been encroaching upon the available or prospective supply to such an alarming extent that a comparatively high ruling has been established, and, of course, the Dutch capitalist feels less comfortable in holding his favorite security.

BILLITON AND STRAITS.

The value of the staple at the opening of the year, 38c., was not long sustained, prices receding in January to 36c., and 35½c., afloat, and some 3000 slabs changing hands. Toward the close of the month, cable advices of improving European markets stimulated dealers and the trade to buy some 6000 slabs, partly to arrive, and the price was firmly re-established at 36c.

London lacking in steadiness, however, and momentarily declining to 137/, the improvement to 36c. was not sustained, and a decline of ½c. had to be submitted to in February, to be recovered immediately after, when a further advance carried the market to 36¾c., under improving European telegrams—quite extensive sales taking place, summing up some 12,000 slabs.

Still greater activity was observable in the month of March, sales summing up to the handsome figure of some 40,000 slabs, partly afloat, at from 37c. to 39c. The ruling, at the close of each of the first three months of the year, had been 36½c. @ 37c., 36c. and 39½c. @ 40½c.

The Maatschappy's spring sale proved to be quite eventful and exciting, some 56,000 slabs selling early in April, Banca ranging from 96 to 98¼ guilders, and Billiton from 93 to 94½, carrying our market to 42c., spot and afloat. The improvement could not be upheld, however, considerable shipments then being known to be on the way from the East, and 2c. were subsequently lost again.

While advancing into midsummer, a further decline of values seemed inevitable, and a gradual weakening occurred during May and June, carrying prices down to 36c., after having stood still at 38½c. @ 39c., in May, but finally, toward the close of June, recovering to 36½c. @ 36¾c.

A faint recovery followed, by reason of a reduced stock, and 37c. was again reached, July closing at ¾c. to ½c., under the influence of the impending duty modifications, which took effect on the 1st of August, after having been in part anticipated by sales afloat at 34½c. The sales during the midsummer months had been but moderate, barely summing up 12,000 slabs, part afloat, to be delivered in August.

Speculation having been stopped, both in Europe and here, by financial considerations, the staple was now abandoned to its own inherent strength, not great on this side, lacking, as it did, all outside interest; and the consequence was, the trade got the better of both the speculative holders and the importers. Thus August soon saw the price at 33c., though at the close of the month, as well as in September, the price recovered to 33½c. @ 34c., to be once more staggered by sales "to arrive" all the year round at 33c., which caused prices to recede to 32c. October—Notwithstanding the fact that prices at the Maatschappy sale, early in the month, were better upheld than had been anticipated, some 50,000 slabs selling at 92 @ 93¼ guilders for Banca and 89 @ 89½ for Billiton. Sales "to arrive" here, 6000 slabs. October closed at 32c. @ 32½c.

The financial disturbances at London having made some further progress, it was found to be impossible to stay a further receding tendency here, some 9000 slabs selling at from 32c. to 30c. on the spot, and at 31½c. afloat., the month closing, on the last Thursday in November, at 30c. @ 31c., and the breakdown becoming still more complete in the early part of December, when some 3000 slabs were sold as low as 29c.

A more encouraging financial aspect in Europe now came to the assistance of the staple, and while prices began to look up, both in Europe, Batavia and Singapore, a recovery of 2c. @ 2½c. took place from the lowest previous point, both on the spot and "to arrive," some 8000 slabs selling, and the market closing for the year at 31c. @ 31½c., with a fair prospect of gradual further appreciation.

BANCA.

The Banca range of prices for the year had been no less eccentric, although less commented upon, this superior class of Tin being less popular in the American market on account of its comparatively high price. The year opened at 42c., and January closed at 41½c. February closed at 41c., and March at 46c. Ruled as the staple was in this market by the same influences detailed under the heading of "Billiton and Straits," prices rose to 50c. in April, and stayed there over May; thence, receding to 48c. in June, the same ruling still being kept up in July and declining to 42c. in August, and to 40c. @ 41c. in September. The general decline in Tin values then carried the staple down to 36c. in October, and to 35c. in November, to finally wind up the year with 37c.

ENGLISH TIN—L & F.

Much firmness characterized the market at the opening of the year, at 37¾c @ 38c, but as a moderate inquiry only prevailed, prices were carried down by degrees to 36c. during the month of January, with a further giving way in February to 35½c. It soon recovered, however, to 36¼c., with a further advance in March to 39c. The improvement made headway in April also, 41¼c. being reached, to close at 41c.

The midsummer stagnation now approaching, May, June and July saw a gradual decline to 36c., the fall being precipitated by the impending duty reduction, August delivery then already selling at 35c., to be followed by a still further decline through August, September, October and November to 29c., when the bottom was reached. A reaction throughout December ensued, and this description finally closed the year firmly at 31¾c. @ 31¼c.

MOVEMENT OF TIN AT NEW YORK AND BOSTON IN 1871 AND 1872.

1871.			Tons.
Imports at New York and Boston,		Straits	4 015
"	"	Billiton	510
"	"	Banca	142
"	"	English L and F.	900
			5,567
Add stock December 31, 1870			250
			5,817
Less export			500
			5.317
Less stock January 1, 1872			241
Consumption			5.076
1872.			Tons.
Imports at New York and Boston,		Straits	4.020
"	"	Billiton	343
"	"	Banca	125
"	"	English L and F.	750
			5,238
Add stock December 31, 1871			241
			5,479
Less lost on the coast			89
			5,390
Less stock January 1, 1873			405
Consumption			4,985

STATISTICAL POSITION OF BANCA TIN IN HOLLAND.

The following statement shows the position of Banca Tin in Holland on the 31st December, from the official returns published by the Dutch Trading Company:

	1872. Slabs.	1871. Slabs.	1870. Slabs.	1869. Slabs.
Deliveries in Dec.	4,980	17,803	16,959	23,186
Previously this year,	97,935	183,008	131,856	121,119
Total 12 months	102,835	200,813	148,815	144,305
Stock, second hand	36,383	34,095	70,900	62,848
Unsold stock	66,513	32,307	80,079	69,800
Total stock	102,896	66,402	150,979	123,648

ANNUAL REVIEW OF THE DUTCH TIN MARKET.

We take the following from the Tin circulars of Messrs. Kreglinger & Co. and Haakmann & Stadmitski:

The rise in Tin was from 87 guilders (for Banca) on the 1st of January, 1872, to 96¾, the average of the spring sales. A slow but continuous decline then began, which continued, with but one unimportant exception, which is found in certain small transactions effected at 97 shortly after the spring sales.

The following shows the supply, not including English from Cornwall:

	1872. Tons.	1871. Tons.	1870. Tons.
Banca	4,012	4,820	4,640
Billiton	2,184	1,259	1,479
Straits	7,368	5,470	2,608
	13,564	11,549	8,827

The consumption (other than of English Tin from Cornwall) has been as follows:

1872. Tons.	1871. Tons.	1870. Tons.
12,416	12,960	10,247

The following were the stocks in Holland and England on the 31st of December:

	1872. Slabs.	Tons.	1871. Slabs.	Tons.	1870. Slabs.	Tons.	1869. Slabs.	Tons.	1868. Slabs.	Tons.
Banca on warrants	34,452	1,633	34,085	1,620	70,900	2,100	62,848	1,936	96,573	2,911
Billiton "	14,873	446	1,756	62	1,440	42	7,500	230	686	21
Straits at London		956		1,300		912		1,910		1,911
Afloat "		755		1,000		570		810		500
Billiton "		710		900		480		450		310
	49,325		35,841		72,340		70,348		97,259	5,843
Quotations of Banca in guilders	Guilders.		Guilders.		Guilders.		Guilders.		Guilders.	
	95		87		76½–77		64⅜		63⅝	
Straits	Pounds St'lg.		Pounds St'lg.		Pounds St'lg.		Pounds St'lg.		Pounds St'lg.	
	188		145		132⅝–133		110		108⅛	
Banca in importer's hands	Slabs.	Tons.	Tons.		Tons.		Tons.			
	66,513	1,995	1,034		2,560		1,946			
Afloat	Piculs.									
	32,350	1,600	984		1,066		1,504			

EXPORTS OF TIN PLATES FROM BRITISH PORTS.

1872. Tons.	1871. Tons.	1870. Tons.	1869. Tons.
119,000	119,755	99,855	96,702

According to Messrs. White & Haskell, New York, there were on hand at New York and Boston, on the 1st of Dec.

1872. Tons.	1871. Tons.	1870. Tons.	1869. Tons.
540	90	261	418

And afloat, 1000, and to arrive during December, January and February, 782 tons.

During these last few months there were some small imports of New Zealand Tin into Australia, and we are informed that considerable lots, both of Tin and ore, are afloat. According to some authorities, the production in that part of the world promises to become an abundant one; according to others, it will barely make up the Cornwall deficiency of 500 tons for 1872. But since all the points given upon this subject of New Zealand production are extremely vague, and set afloat according to the individual interests of the informants, we omit details.

THE IMPORTS OF BILLITON TIN AT AMSTERDAM AND ROTTERDAM IN 1872 WERE AS FOLLOWS:

	Amsterdam.	Rotterdam.	Total.
Slabs	53 425	17,621	71,04 6
Stock Jan. 1, 1872	1,000	756	1,756
	54,425	18,377	72,802
Sold and ship'd 1872	42,430	15,499	57,929
Stock Jan. 1, 1873	11,995	2,878	14,873

MOVEMENT OF TIN AT BRITISH PORTS.

	1872. cwts.	1871. cwts.	1870. cwts.
Im. into the United Kingdom			
of Foreign and Colonial Tin	166,000	170,660	94,307
Export of English Tin	115,003	114,311	101,696
Export of Foreign Tin	50,000	41,193	21,946

COURSE OF PRICES OF STRAITS TIN AT LONDON DURING 1872.

January	£140	@	£148
February	134	@	144
March			150
April	150	@	155
May			151
June	147	@	150
July	157	@	150
August	144	@	148
September	153	@	149
October	138	@	142
November			131
December	130	@	138

MAASTSCHAPPY SALES AND PRICES REALIZED FOR A SERIES OF YEARS.

Tin.

Years.	Slabs.	Prices. Lowest.	Highest.	Average at Sales.
1843	104,802	*f* 34	*f* 38	*f* 35·75
1844	57,403	40	43	41·25
1845	88,017	40 50	60	43·70
1846	68,804	52	60	55·25
1847	61,478	45·50	60	47
1848	98,675	40	50	41·25
1849	240,937	40	58	40·03
1850	117,796	41·25	50·25	50·25
1851	111,190	46	51	47·65
1852	156,700	47·50	56	50·50
1853	122,312	57	77	72
1854	132,864	64·50	79	66
1855	134,430	62·50	75·50	74·50
1856	167,382	72·75	86	73·50
1857	190,559	56	92·50	82·25
1858	190,842	68	74·75	68·20
1859	139,128	75	87·25	82 50
1860	151,513	77·75	82 50	79·50
1861	149,188	66·50	78	69
1862	155,193	66·25	74·50	67·75
1863	119,090	67	79	76
1864	146,921	56·50	73	61·75
1865	169,927	54	60·50	56
1866	111,746	44·50	57·50	49·85
	109,359			46
1867	69,477	50·25	65·75	54
	71,029			54·25
	10,600			55
1868	2,500	51·75	64	55·05
	89,586			54·50
	49,500			82·50
1869	61,633	64	86	74
1870	76,863	61·50	79·50	72·50
	80,004			75·30
1871	80,791	75	88 50	75
	83,217			78·80
1872	55,380	97	84·75	96·76
	49,343			92·12

Copper.

	Years.	Stocks Jan. 1. Kilos.	Quotations. Highest.	Lowest.
Drontheim	1866	31,000	*f* 53	*f* 51
	1867	30,000	53	48
	1868	71,200	44	44¼
	1869	18,000	47½	45½
	1870	8,000	41¾	41
	1871			
	1872			
Old Copper	1866		51	44
	1867		45	38
	1868		41½	45
	1869		42¾	40
	1870		37	35
	1871		46	36½
	1872		50	46

Iron.

	Years.	Quotations.		
Com. Swed	1866	*f* 15	@	14¾
	1867	14¾	@	15
	1868	13¾	@	15
	1869	13¾	@	15
	1870	13¾	@	15
	1871	13¾	@	15½
	1872	22	@	
Com'n Eng. Bar	1866	8¾	@	9¾
	1867	7	@	8
	1868	7½	@	8¾
	1869	9¾	@	8
	1870	9½	@	8
	1871	8¾	@	10
	1879	15	@	16

Com'n English Sheet	1866	16	@ 17
	1867	15	@ 16
	1868	14	@ 15
	1869	15½	@
	1870	16	@
	1871	14½	@ 16
	1872	27	@
Scotch Pig	1866	4½	@ 5½
	1867	4	@ 4½
	1868	3½	@ 4¾
	1869	4½	@ 4
	1870	4	@ 4½
	1871	4½	@ 5
	1872	8	@ 8½

Lead.

Years.	Quotations.	
1866	£ 11	@ 13
1867	11	@ 11½
1868	11½	@ 11⅝
1869	11⅝	@ 11⅝
1870	11½	@ 11¾
1871	10½	@ 11⅝
1872	13¾	@

Spelter.

Years.	Quotations. Highest.	Lowest
1866	£ 24	£ 22
1867	22	21
1868	21	21
1869	29	28
1870	29	28
1871	26	23
1872	28	30

REVIEW OF THE TIN PLATE MARKET FOR 1872.

With but a limited stock on hand, the market kept steady during the month of January at the following quotations: I. C. Charcoal, $10·25; Charcoal Terne, $9·25 @ $9·50; I. C. Coke, $9 @ $9·25, and Coke Terne, $8·25 @ $8·50; thence a decisive and rapid movement developed both in Europe and here. In February prices advanced to $11 @ $11·50, $9 @ $10·50, $10·50 @ $11 and $8·50 @ $9·25. Some further advance took place in March, at the close of which the range stood as follows: $12·50 @ $13, $10·25 @ $11, $10·75 @ $11, and $9·62½ @ $9·75. In April the climax was reached, the following extreme figures then ruling: $13·75 @ $14, $12·50 @ $13, $12·50 @ $13, and $10·50 @ $11·25.

The duty reduction now beginning to agitate the mind of the trade, a decline took place of from 50c. to 75c. per box in May, the bill passing in June, and during that month and July the market remained dull and drooping, to be relieved by a large "future" business for August delivery. But the English market simultaneously weakening, it was impossible to restore tone to it here for the remainer of the year, with the sole exception of the latter part of December, when it was discovered, both here and on the Continent, that stocks had run low in second hands, and the sudden demand thus created caused the English market to rebound vigorously from so long a prostration. The whole situation had changed; consumption had been largely stimulated at an unreasonably low price, and the year closed with a healthy feeling, and great readiness to anticipate the future by purchases ahead all the way into April—the demand being from the trade, and little or no speculation participating in and marring its legitimate tendencies. The closing quotations were as follows: I. C. Charcoal, $10·75 @ $11; Charcoal Terne, $9·75 @ $10·75; I. C. Coke, $9·50 @ $10, and Coke Terne, $8·50 @ $9.

MPORTS OF TIN PLATE INTO THE UNITED STATES—ATLANTIC COAST.

	Boxes.
1864	504,882
1865	784,930
1866	1,021,261
1867	993,744
1868	1,187,947
1869	1,234,523
1870	1,191,615
1871	1 439,135
1872	1,409,970

The Iron Trade of Pittsburgh.

We take the following from the Pittsburgh *Commercial's* review of the trade of that city for 1872:

In 1870, in iron and steel alone, we had $26,692,686 invested as capital, and employed 15,541 hands. The increase in the number of rolling mills, furnaces, foundries, etc., is so rapid that the figures of one year furnish no data for the next. In 1863 we had 27 rolling mills, which had increased in 1871 to 43—an increase of 60 per cent. in eight years. During the same time the foundries and machine shops had increased from 45 to 75, or 68 per cent. Puddling furnaces increased from 262, in 1863, to 562 in 1871, or 115 per cent. The number of nail machines increased from 408 to 508, or 25 per cent. In 1863, 132,000 tons of metal were used by the mills, while in 1871 400,000 tons were consumed. The number of blast furnaces has largely increased, and the manufacture of pig iron here may be said to be in its infancy as yet. It required a long time to demonstrate that the ore could be carried to this city and smelted at a profit. Up to 1872 we had but five furnaces in blast, with the capacity of 1000 tons per week. During the last year, four new furnaces were erected, and are now in successful operation, turning out 1700 tons of metal per week. These nine furnaces now produce annually about 150,000 tons. The total consumption of raw iron in this city, in 1872, was not less than 600,000 tons, so that we have had to draw from abroad 450,000 tons to supply the demands of the year. Several other furnaces are projected, and the time is not far distant, in the opinion of those experienced in the business, when all the raw iron consumed here will be the immediate product of our own furnaces. There is no reason why this should not be so. The total product of pig iron in the United States, for the year 1870, was 2,045,123 tons, so that Pittsburgh consumed over one-fourth of the whole production of the country.

As will be seen by reference to our tables, given below, the total receipts of pig iron, iron ore and blooms, at Pittsburgh, for 1872, was 496,648 tons, against 367,207 tons in 1871. The amount of Lake Superior ore received here in 1872 was 81,630 tons, against 48,080 tons in 1871. Of Iron Mountain ore we consumed in 1872, 67,630 tons, against 36,390 tons in 1871. There have also been used 20,580 tons of Lake Champlain ore (the first ever used here), and 4010 tons of "native" ores.

Pennsylvania still holds her proud position as the foremost State in the Union in the production of iron, having produced 1,083,272 tons of pig, out of the total of 2,046,123 tons manufactured in the United States in 1871; and 1,065,686 tons of ore out of the total product of 3,210,918 tons mined in the same year.

Pittsburgh is doing her full share toward keeping our State in the front rank in this respect, and had we the time to follow the pig iron through our rolling mills, machine shops, foundries, etc., and give the various products, some idea might be formed of the magnitude of this city as a manufacturing center.

Our statistics of the coal trade for the past year exhibit a very large increase over previous years, as the following summary will show:

	Coal—bushels	Total.
1870—By river	44,240,000	
1870—By rail	23,128,725—	67,368,725
1871—By river	50,864,600	
1871—By rail	45,921 035—	96,785,635
1872—By river	57,708,800	
1872—By rail	57,956,346—	115,065,146

The above shows the great bulk of the production of the coal mines in the Monongahela valley, and on the lines of our several railways. The receipts "by river" are made up mainly of the coal mined for exportation to the Western and Southern markets; while those "by rail" embrace a large portion of what is consumed here. We have no data for ascertaining the exact amount used for home consumption, as no separate record is kept. It will be observed that the shipments by rail have increased in a much greater ratio than those by river. In 1870, the water shipments exceeded those by rail over 20,000,000 bushels; while in 1872 the difference in favor of the rivers is only a fraction over 350,000 bushels.

The coke trade, which is comparatively a new branch of industry here, still makes rapid strides, and will increase in proportion to the demand for smelting purposes. In 1870 the receipts of coke were 11,594,000 bushels; in 1871 the receipts were 22,357,400 bushels; and in 1872 43,927,965 bushels—an increase of 21,570,565 bushels.

The following tables show the monthly receipts of pig iron, iron ore and blooms, by the various railroads, for four years ending December, 1872:

	1869. Tons.	1870. Tons.	1871. Tons.	1872. Tons.
P., Ft. W. & C. R. R.	88,510	112,400	174,490	151,700
Clevc. & Pitts. R. R.	41,750	60,810	61,600	108,190
P. R. R.	58,180	68,620	58,240	86,385
West Penn. R. R.	120	1,930	6,180	27,440
A. V. R. R.	7,670	8,180	14,710	19,940
Pitts. & Connellev.	1,580	4,050	11,540	21,010
P., C. & St. L. R. R.	....	....	4,160	10,090
Total tons	197,810	255,960	330,920	424,515

Following are the receipts of pig iron and blooms, by river, for 1871–72:

	1871. Pig iron.	1872. Pig iron.	1871. Blooms.	1872. Blooms.
January	418	1,143	....	....
February	1,280	400	....	....
March	5,670	257	535	....
April	5,760	2,467	587	300
May	4,377	1,644	20	26
June	....	5,185	....	200
July	....	1,621	....	....
November	....	150	....	....
Total tons	17,305	12,877	1,142	526

LAKE SUPERIOR AND IRON MOUNTAIN ORES.

The following tables show the receipts of Lake Superior and Iron Mountain ores at this point. These receipts are included in the tables given above, but are presented separately for the purpose of exhibiting the quantities of these ores consumed here, and the large increase in the receipts:

LAKE SUPERIOR ORE BY RAIL FOR THE FOLLOWING YEARS.

	1870. Tons.	1871. Tons.	1872. Tons.
January	4,780	5,210	6,910
February	3,390	6,380	4,630
March	3,190	4,100	6,010
April	2,320	1,650	7,220
May	2,710	2,970	2 610
June	3,980	4,880	4,260
July	3,880	3 430	10,990
August	2,900	3,970	9,200
September	4,890	3,660	6,620
Octob r	4,420	3,990	7 540
November	4,310	3,640	7,630
December	4,130	4,210	8,000
Total tons	44,900	48,080	81,630

IRON MOUNTAIN ORE RECEIVED BY RIVER AND RAIL FOR THE PAST TWO YEARS.

	River. 1871. Ore. Tons	River. 1872. Ore. Tons.	Rail. 1871. Ore. Tons.	Rail. 1872. Ore. Tons.
January	1,320	1,700	660	920
February	2,750	1,225	1,020	1,580
March	8,380	600	830	2,730
April	1,570	7,600	420	2,790
May	4,830	5,310	430	2,210
June	....	7,075	640	2,820
July	....	....	370	5,260
August	....	....	1,000	5,310
September	....	....	1,190	3,260
October	....	....	1,070	2,410
November	7,890	8,800	520	3,620
December	1,000	1,200	610	1,990
Total tons	27,740	33,540	8,650	33,890

ORE FROM OTHER POINTS,

Received by rail from June to December, 1872:

Lake Champlain ore, tons	20,580
Native ore, tons	4,010
Total tons	24,590

The following are the receipts of pig iron, iron ore, and blooms, from all points, by river and rail, including Lake Champlain and native ores:

	1871. Tons.	1872. Tons.
By rail	320,920	449,105
By river	46,287	47,543
Total	367,207	496,648

The following shows the receipts of coal and coke for the year:

BY RIVER.

	Coal. 1872.	Coke. 1872.
By slac'water, bushels	54 203,800	3,071,700
Saw Mill Run	3,500,000	....
Total	57,708,800	3,071,700

BY RAIL.

Pennsylvania Railroad, bituminous, bushels	17,384,104	....
Pennsylvania Railroad, anthracite, bushels	386,000	12,500,000
Allegheny Valley Railroad, bituminous, bushels	6,089,710	....
Pittsburgh & Castle Shannon Railroad	3,168,432	....
Pittsburgh, Cincinnati and St. Louis, estimated	10,000,000	....
Pittsburgh and Connellsville	20,714,100	27,956,265
Total, 1872	115 065,146	43,927,965
Total, 1871	96,785,635	23,357,400
Increase over 1871	18,279 511	20,570,565

Statistics of Banca Tin, from 1862 to 1872, Inclusive.

		1862.		1863.		1864.		1865.		1866.		1867.	
		Slabs.	Slabs.	Slabs.	Slabs.	Slabs.	Slabs.	Slabs.	Slabs.	Slabs.	Slabs.	Slabs.	Slabs.
Stocks, 21 hands, Dec. 31	Amsterdam, on warrants	29,700		36,140		30,957		50,400		74,743		87,739	
	Rotterdam, "	40,040		39,398		35,950		46,459		56,366		63,370	
	In private hands	2,000	71,740	2,000	77,538	2,000	68,907	2,000	98,859	....	121,109	....	151,109
Maastschappy stocks for next sale	Amsterdam	30,528		21,280		33,573		34,865		38,709		16,196	
	Rotterdam	27,324		28,456		27,360		52,854		19,433		14,447	
	Dordrecht, Schiedam & Middelb	4,076	61,928	3,130	52,966	12,471	73,404	6,051	93,770	6,892	64,534	4,925	35,568
Maastschappy in ports	Amsterdam	71,935		50,570		80,894		78,414		100,746		50,594	
	Rotterdam	48,735		48,700		63 203		90,805		71,824		43,753	
	Dordrecht, Schiedam & Middelb	23,215	143,885	10,858	110,128	29,262	173,359	15,077	184,295	19,678	192,248	17,193	111,540
Maastschappy auctions		Rott., June 25.	155,193	Amst., June 24.	119,090	Rott. June 29.	146,921	Amst., June 29.	169,927	Rott., M'ch 22. Amst., Sept. 28.	111,745 109,359	Amst., M'ch 28. Rott., Sept. 26.	69,477 71,029
Exports from Holland			139,494		113,292		155,552		139,975		188,855		190,506

		1868.		1869.		1870.		1871.		1872.	
		Slabs.	Slabs.	Slabs.	Slabs.	Slabs	Slabs.	Slabs.	Slabs.	Slabs.	Slabs.
Stocks, 21 hands, Dec. 31	Amsterdam, on warrants	71,300		31,600		37,900		25,995		27,233	
	Rotterdam, "	24,873		28,248		33,000		8,100		7,219	
	In private hands	....	96,073	....	62,848	....	70,900	....	34,095	....	34,452
Maastschappy stocks for next sale	Amsterdam	15,303		15,288		32,851		19,127		40,539	
	Rotterdam	29,353		41 920		37,150		9,798		26,144	
	Dordrecht, Schiedam & Middelb	1,282	45,941	3,492	60,800	10,078	80,079	3,282	32,207	....	66,513
Maastschappy imports	Amsterdam	45,986		43,372		69,698		61,811		80,815	
	Rotterdam	57,270		78,139		106,448		51,425		53,357	
	Dordrecht, Schiedam & Middelb	9,804	113,060	4,481	125,992	....	176,146	....	116,236	....	134,172
Maastschappy auctions		Rott., M'ch 31. Amst., Sept. 30.	51,089* 89,587	Amst., April 1. Rott., Oct. 1.	49,500 61,633	Rott., M'ch 31. Amst., Oct. 7.	76,863 80,004	Amst., M'ch 30. Rott., Sept. 28.	80,791 83,217	Rott., April 11. Amst., Oct. 2.	52,771 46,512
Exports from Holland			157,723		144,305		148,815		200,813		98,927

* Of which 10,600 slabs were sold at auction, and 2500 slabs by subscription. The remaining 38,989 slabs were sold at the fall sale.

Recent Progress in Iron and Steel Industries.

We take the following, relative to recent progress in the iron and steel industries of Austria, Belgium, France, Germany, Italy, Spain and Sweden, from a paper contributed by Mr. David Forbes, F.R.S., etc., to the *Journal of the Iron and Steel Institute:*

AUSTRIA.

According to the most recent accounts, the manufacture of iron in this country continues progressing steadily, all the works being in full and active operation. The total production of iron ores and cast iron of all kinds, during the years 1869 and 1870, in the Austrian Empire, including Hungary is reported to have been as follows:

	1869. Viennese centners.	1869. English tons.	1870. Viennese centners.	1870. English tons.
Iron ore extracted	12,286,664	680,606	14,913,407	821,961
Cast iron produc'd	4,965,544	273,725	5,024,827	276,982

Increase in 1870 of English tons of iron ore extracted, 141,295; of cast iron produced, 3257.

A. Kerpeley, the professor of iron metallurgy in the Royal Mining Academy of Schemnitz, in Hungary, has just published a work on the present condition and future prospects of the iron manufacture in Hungary. As there are more than 150 iron works so treated, some idea may be formed of the time and labor which the professor has devoted to his task.

BELGIUM.

Every branch of the iron trade of Belgium appears to be in a most prosperous condition, and since many years there has never been so much activity displayed, nor have quotations been so high as at present. It has been found impossible to keep pace with the orders which have flowed in from all sides, the entire product of many of the iron works being already engaged for a long time in advance, and contracts have been refused for delivery in the spring of 1873. Prices have advanced still more, owing to the difficulty of procuring a full supply of the raw materials, and many complaints are heard of the deficiency of coke, which is now at from 18/9 to 19/ per ton.

The total exportation of Belgian iron last year has increased, the figures being 259,000 tons in 1871, as compared with 250,000 tons in the preceding year. The exportation to Russia had, however, been very much less, and the quantity sent to France and the Netherlands also diminished, being respectively 4000 and 7000 tons less in 1871 than in 1870. The following figures show the more important items in the exportation of the last two years:

	1870.	1871.	Increase.	Decrease.
	Tons.	Tons.	Tons.	Tons.
Russia	64,000	22,500	.... ..	41,500
Zollverein	58,000	96,000	38,000	.....
United States	11,000	18,000	7,000	.....
Austria	1,300	14,000	12,700	.....

The importation of rough pig iron increased last year by about 5 per cent., having risen from 82,000 tons in 1870 to 86,000 tons in 1871, whilst the imports of iron generally show an increase of about 4½ per cent., principally from England and Sweden, and those from France and the Netherlands had declined.

The total exportation of wrought and cast iron of all kinds, during the month of January, was 14,483 tons, which is an increase of 10,816 tons over January, 1871, but is still 3162 tons less than in January, 1870, showing that the trade has not even yet attained the high point at which it stood before the war. In value, the exports of rails have increased 558,114f., and that of other rolled iron 608,160f., beyond that of the corresponding month last year. The importation of cast and wrought iron of all kinds amounted to 8300½ tons in the month of January, of which 6431 tons of pig iron came from England. Of the iron ore imported, 44,796 tons came from the German Zollverein, and comparing this month in 1872 with the corresponding one in 1871, it will be found that there is an increase in the value of iron minerals imported, of 786,682f., and of 418,840f. in that of pig and scrap iron.

With respect to steel, Belgium imported in January, this year, 713 tons of cast, bar, sheet, and wire steel, but only exported 16 tons in the same month. Preparations are, however, being made to increase this manufacture very largely, both as regards Bessemer, as well as other qualities of steel; the Martin-Siemens process has recently been introduced at the Sclessin establishment, where a furnace, constructed under the superintendence of M. Noblet, has just been put into work.

The exportation of steel in bars, which in 1870 only reached 320 tons, increased last year to 4000 tons, of which 2200 went to Turkey for railway purposes. To England, Belgium exported last year 653 tons steel, against only 3 tons in 1870, but to France the quantity was even less than before.

The number of workmen employed in some of the principal iron works of the province of Liege, at the commencement of this year, has been reported as follows:

Couthuin Ironworks	62
Lamirne, mines and works, Amp-in	600
Dumont freres works, at Schlaigneaux	175
L'Esperance mines and works, at Liege	1,800
Grivegnee "	1,250
Jemeppe, rolling mills	100
John Cockerill, mines and works, Seraing	3,578
Jowa, Delheid & Co., ironworks, Liege	300
Jupille, rolling mills	150
Ougree, blast furnaces and works	1,270
Sclessin, mines and works	2,653
Vesdre at Dobhain, blast furnaces	100

The report of M. Emile Laguesse, Ingenieur en chef Directeur des Mines, on the Industrie Minerale et Mineralurgique de la Province de Hainaut, has been forwarded us; it brings us down to the commencement of last year, and from it the following extracts are made: In the year 1870, 94 iron mines, having a mean depth of only 69 feet from the surface, were in operation in this province, employing 318 workmen and turning out 86,463 tons of raw ironstone, which, when washed, afforded 80,000 tons of clean ore, valued at 610,375f., or about £24,000.

The total value of the products of the iron industry of the province of Hainaut for the five years, from 1866 to 1870, is given in francs as follows:

	Iron Ores.	Cast and Wrought Iron.
1866	657,480	75,317,700
1867	434,320	65,084,592
1868	284,640	60,854,533
1869	533,960	81,037,795
1870	610,375	87,944,645

In Luxemburg, the extraction of ironstone from the mines in 1870 amounted to 1,010,000 metrical tons, of which 36·3 per cent. were smelted in the country, 38·4 per cent. sent to Belgium, and the remaining 25·3 per cent. exported to Prussia. With the exception of about from 5 to 6 per cent., the whole of this ironstone was of that kind of pisolitic ironstone called on the Continent minette; it is explored by open workings on the very regular and nearly horizontal beds of the calcareous marls in the oolitic formation. This ore costs about 1/8 per ton to extract, and is sold at from 2/6 to 3/4 per ton; but as it contains a considerable amount of phosphorus, it does not produce a good pig iron, and is, in practice, generally used along with an admixture of iron of a better quality to improve it. The entire production of pig iron in Luxemburg in 1870 amounted to 158,000 metrical tons, but it is increasing so very rapidly that it is estimated as likely even to exceed 300,000 tons in 1872.

Reports that immense discoveries of carbonate of iron have been made in Luxemburg and in the Grand Duchy, have very recently attracted much attention, but as yet no reliable information has been obtained concerning these deposits.

FRANCE.

The law just passed by the Assemblee Nationale regarding the merchant navy will have considerable influence on the steel manufacture of France, since it imposes an additional duty on all goods, except the produce of French colonies, imported in foreign bottoms; from European countries, including, of course, the Mediterranean shores, this amounts to 0·75f. (7½d) per 100 kilogrammes (220 lbs.); so that the iron ores from Corsica, Elba, Africa, Spain, etc., which usually arrive in foreign ships, will be subjected to a tax of some 6/ per metrical ton (2206½ lbs.), a duty which is out of all proportion, considering that such ores only cost from 6/ to 8/ at the mine, and are annually imported into France at the rate of between 300,000 and 400,000 tons.

As regards the iron manufacture, things are looking very much better in all parts of France; the position of the ironworks in the Muerthe group is excellent, and their products deservedly in favor. All the establishments in the Muerthe Moselle have resumed work, and are in full operation. At Nancy, 18 blast furnaces, and at Longwy 9 are in work. Some few furnaces in the Haute Marne group have also been blown in, as well as some new coke furnaces pertaining to the Anzin Company. The works of the Marquis de Lambertye at Cons-la-grandville, in the Arondissment de Briey, are again in operation, and the Orges and Chateauvillian furnaces are about to be put into blast. From St. Dizier the completion of two large furnaces, one at Brousseval, and the other at Marnaval, St. Dizier, are reported, and the journal *La Houille* announces the erection of six new blast furnaces in the Chavigny district.

Difficulties are still experienced from defective railway and river communication, many of the bridges broken down in the war not being as yet rebuilt, and the navigation of the Seine much interrupted by the works involved in their repair. Combinations have been formed to reduce as much as possible the inconvenience attendant on this state of things and the scanty means of transport: thus several masters in the Longwy district, MM. Giraud, Labbe, Helson, and D'Huart, have arranged for a daily train of 250 tons from the central basin, which is divided *pro rata* amongst the co-operating firms; at present, however, everything tends to maintain the high prices of coal and coke.

The production of cast iron in France, during the second half of 1871, is returned at a total of 486,090 tons, of which 87,334 tons are foundry, and 398,756 tons forge pig; this shows a diminution of 230,000 tons, or about 33 per cent. less, when compared with the production of the second half of the year 1869, of which one half is probably due to the loss of territory now annexed to Germany. During the second half of 1871, the make of wrought iron is reported at 69,491 tons of rails, 48,484 tons of plates, and 256,540 tons of other descriptions of wrought iron.

The importation of cast and wrought iron and iron ores into France, during the years 1870 and 1871, is returned as follows:—

Importations.	1870. Tons.	1871. Tons.	Decrease. Tons.
Pig iron and castings	139,113	91,107	48,006
Wrought iron	75.116	27,578	47,538
Iron ores	485,093	378,577	106,416

The falling off in the importation of iron ores is due principally to the smaller quantity of ore received from Germany. The details of the imported ores show Algeria to have sent 155,608 tons; Belgium, 92,228 tons; Spain, 91,427 tons; Italy, 31,649 tons; Germany, 6000 tons; Switzerland, 19 tons; and other countries, 1646 tons.

In 1869, France produced 52,000 tons steel, or about twenty-nine times as much as in 1864, and in the first half of 1870 no less than 44,419 tons; so that it is estimated as soon as France recovers from the effects of the late war, that the country can turn out some 90,000 tons annually. In 1871, the Terre Noire Works sent steel rails to the United States for £30,000, which is the first occasion of any exportation of steel rails from France to that country; in the second half of last year 22,850 tons of steel rails were rolled in France, and 4881 tons of steel in bars and other forms were also produced.

A new memoir by M. Gruner, professor of metallurgy at the School of Mines in Paris, has just appeared, and contains the results of his investigations on the action of carbonic oxide upon metallic iron and on the oxides of that metal. "Memoire sur le

dedoublement de l'oxyde de carbone sour l'action combinee du fer metallique et des oxydes de se metal. Par M. L. Gruner." The study of this memoir is recommended as throwing considerable light upon previously but little understood, although very important, phenomena.

GERMANY.

About the middle of March, arrangements were completed for the amalgamation of three of the largest ironworks in Rhenish Prussia, viz., Heinrichshuette, New Schottland, and Dortsmundshuette, under the name of Union Company, the object of which is to carry on coal and iron mines along with iron and steel works, with a capital of £1,650,000 in ordinary, and £650,000 in preference shares. The principal people interested in this company are the banking firms of Rothschild, of Frankfort, Oppenheim, of Cologne, the Discount Company of Berlin, and the Provincial Discount Company of Hanover, in conjunction with several wealthy gentlemen of Rhenish Prussia. The works now belonging to the new company are well located. Heinrichshuette has four blast furnaces of large dimensions, a Bessemer steel works, fifty-six puddling-furnaces, and a forge with rolling mill, beside the Karl Friedrich coal mine, and excellent iron mines of spathic carbonate, brown and red hematites and black band ores, situated in Westphalia, Siegen, and Nassau. New Schottland also possesses four blast furnaces, two at Hassdinghausen, and two at Horst, at which place there are also Bessemer steel works, two large forges and rolling mills at Horst and Aplerbeck, and two mines of black band iron ore, situated respectively at Hiddinghausen and Neustueter. The Dortmundshuette comprises a large forge and rolling mills, with over 100 puddling furnaces, at Dortmund; two blast furnaces at Gothfresen, and the extensive Gluckauf coal mine, near Dortmund. These works, which are situated in the center of the Ruhr coal basin, having ample railway facilities in all directions, are considered capable of producing annually from their own mines and works about 100,000 tons of pig iron, along with 150,000 tons of rails and other wrought iron, and 20,000 tons of steel.

In Western Germany, special attention is now being devoted to the production of Bessemer pig and to spiegeleisen, for exportation to Bessemer steel works in other countries; in consequence of the increased demand, the prices, both of spiegeleisen and of the manganiferous ores from which it is made, have advanced still more, and most of the ironworks are doing a splendid business.

The Bessemer pig from the Georg-Marienhuette, near Osnabrueck, is in great request for making steel rails and puddled steel, both in the vicinity, and as well as in Saxony in Austria. Even in 1870, during the war, this establishment paid a dividend of 8 per cent., and it is anticipated that for 1871 they will declare one of 15 per cent. With four blast furnaces in constant operation, the works turn out about 65,000 tons of Bessemer pig, using for this purpose about 160,000 tons of ore along with 150,000 tons of coal. The ores are somewhat calcareous, consisting of hard crystalline manganiferous carbonates of iron and soft brown hematites, derived from the Huegge hills in the Teutoburger Wald, about seven miles southwest of Osnabrueck, where they occur in a deposit from 18 to 37 ft. thick, dipping 26 deg. to the northeast, which is known to extend some 2½ miles, and is worked in open terraces at the mines of Hermine, Brockmann, and Bothenberg, but underground in the Hedwig mine; in 1870, these mines yielded 180,963 tons of iron ore.

The larger portion of the coal consumed in these works comes from Westphalia, but in 1870, 45,025 tons were obtained from the Oesede and Bargloh collieries, to the southeast, which are connected with the works by a railway. The works were commenced in 1858 with one blast furnace, but did not prove a success for the first few years; they now, however, have six blast furnaces, and employ 1500 men. The blast furnaces are 58 ft. high, with from 13 to 16 ft. diameter, and a capacity of from 6131 to 8286 cubic ft., and are worked on Luhrmann's system of closed breasts, with constant efflux of slag through the slag openings. The blast is supplied by five blowing engines, with horizontal cylinders, the steam cylinders being 51 in. and the blowing cylinders 108 in. in diameter, whilst the stroke is 7 ft. in both. The piston rods are hollow, 14 in. diameter, and 1¾ in. thick. The pressure of the blast is from 4½ to 4¾ lbs. on the square inch, and the engines work with from 45 to 46 lbs. steam pressure, ¾ expansion, and 21 strokes per minute. The hot air stoves are on the free suspended pipe system, each having 1400 sq. ft. of heating surface, and are capable of raising the blast to a temperature of 850 deg. to 930 deg. Fahrenheit. Three such stoves, heated by separate fires, are attached to each blast furnace.

The principal railways of the Rhenish provinces and their connections have concluded an agreement by which all raw materials, like coals, ore, limestone, etc., are to be carried at the rate of one pfenning per 100 kilogrammes per mile, or about five-eighths of a penny per ton per mile, an arrangement calculated to be of much importance to the iron trade of these districts. The general state of the iron trade on the Rhine has been exceedingly brisk, and has now quite recovered from the effects of the war.

In Silesia, a company bearing the name of the "Vereinigte Laura und Koenigshuette," with a capital of 6,000,000 Prussian dollars, was established in June last, for the purchase and working of the ironworks and collieries known under these names, both of which were the property of Count Henckel of Donnersmarck, who, however, had only purchased the Koenigshuette works from the Prussian government the year before, when they were put up and knocked down to him by public auction.

During the first half year of this new company's existence, which is just terminated, the production of pig iron from their blast furnaces amounted to 43,106 metrical tons, nearly the whole of which had been utilized by the puddling furnaces and rolling mills of the company, which, during the same period, turned out 31,987 tons of wrought iron, chiefly in the form of rails and plate.

The extent of the iron and steel industries of Prussia, during the year 1870, is show by the following figures:

Iron ore extracted in 1870	2,676,400	tons.
Pig iron made	1,123,422	"
Cast ings made	236,856	"
Wrought iron made	627,900	"
Puddled wire made	128,193	"
Steel of all kinds made	157,901	"

According to the mining and metallurgical statistics of the kingdom of Saxony, as given in the Jahrbuch fur den Berg und Huettenmann auf das Jahr 1872, the total amount of iron ore raised to the surface during the year 1870, which is the last official return, did not amount to more than 16,061 metrical tons, valued at under £12,000.

Much attention has been given of late in Germany to the question of machine puddling, and the probable influence which its general introduction may have on the iron trade of the country. A long article on the subject, by M. Cappe, in the "Gluckauf" journal, concludes by stating: "Although the results already obtained do not appear so great as to lead to a complete revolution in the system of puddling, nevertheless, if, as appears probable, it does economize in reheating the balls and reducing the consumption of coal and manual labor, the Danks furnace may have a great future wherever the ore is cheap, the pig iron and labor dear, or where good workmen are scarce."

The great cast steel works of Friedrich Krupp, at Essen, in Rhenish Prussia, employed during the year 1871, 8810 workmen, and turned out 75,000 metrical tons of cast steel, in the form of axles, tires, rails, shafts, rolls, boiler plates, springs, artillery, projectiles, etc. The plants consisted of 528 annealing and cementing furnaces; 260 heating, re-heating and puddling furnaces; 245 coke furnaces; 130 miscellaneous furnaces; 169 forges; 174 steam boilers; 343 lathes; 73 shaping machines; 130 planing machines; 172 punching machines; 303 other machines, of all kind, and 58 steam hammers, varying in weight from 2 cwt. up to 30 tons, the three larger being of about 10, 20 and 30 tons respectively. The steam engines in this establishment were 265 in number, varying in force from 2 up to 1000 horse-power, and representing in the aggregate no less than 8359 horse-power.

ITALY.

The mines of iron ore at San Leone, near Cagliara, in the Island of Sardinia, which are now being worked by the French Company MM. Petin et Gaudet, are located in the Silurian slates, and are lodes running nearly magnetic north and south, with an underlay to the west; they contain an abundance of garnets, with a little quartz, and the ore, which is a native oxide of iron, has the following composition:

Sesquioxide of iron	62·00
Protoxide of iron	24·00
Oxide of manganese	0·80
Sulphur	0·20
Loss on ignition	13·00
	100·00
Percentage of metallic iron	62·05

The exportation of iron ores from Italy to other countries, especially France, which last year imported 31,649 tons, is gradually increasing, the ores themselves being in general both rich and of extremely good quality.

SPAIN.

Our latest information from this country, relates to the activity which English enterprise and capital is now displaying in developing the extensive and valuable deposits of rich iron ores known to exist in many parts of the Peninsula, in order to supply the British ironmaster with ores of high quality, suitable for the manufacture of Bessemer steel. Amongst these we find a new company, entitled "The Malaga Magnetic Iron Ore Company, Limited," which has been brought out recently, for the purpose of working and shipping to England the rich and extensive deposits of iron ore in the Valley of La Palmitera, about 16 miles from the Coast of the Mediterranean. The two deposits, called respectively "La Colosal" and "El Auxiliar," appear to be but parts of one great lode of native magnetic oxide of iron, the quality of which may be judged from the following analysis, by Dr. Wallace, of Glasgow:

	La Colosal.	El Auxiliar.
Peroxide of iron	68·04	70·40
Protoxide of iron	21·57	21·96
Oxide of manganese	1·40	traces.
Lime	·50	traces.
Magnesia	1·18	3·36
Alumina	3·42	1·50
Silica	2·60	0·30
Sulphur	0·04	0·04
Phosphorus	0·01	....
Water, with traces of carbonic acid	1·74	2·44
	100·00	100·00
Percentage of metallic iron	64·25	66·36

There is no doubt about ore of this character being well adapted for the production of pig iron suitable for conversion into Bessemer steel; but it is a mistake to imagine, as stated in Dr. Wallace's report, that such ore will be more readily smelted than the Whitehaven hematite, as it is well known to all who have had practical experience in the working of such ores in blast furnaces, that the native sesquioxides of iron are much easier of reduction than the magnetic oxides, which, unless submitted to a previous calcination, are as a rule very refractory. The importation of this ore into England would, no doubt, be welcomed by our ironmasters; yet it is to be feared that the freight from the Mediterranean to this country, will, in practice, prove much higher than anticipated in the prospectus of the company, if the exportation of this iron ore is to be conducted upon anything like a large scale.

Several other mines of magnetic oxide of iron in the South of Spain and in Portugal are understood to be in the market for purchase, but as yet have not been taken up.

The exportation of iron ore from the Bilbao district of England is now carried on as actively as the present extremely defective arrangement for transporting the ore to shipping places on the river and for loading it into the vessels will admit of. A considerable quantity of ore is sent down the river in barges, from the brown hematite mines, located above the city of Bilbao, and loaded into vessels at Olaveaga, some four miles below the town, to which place ships drawing up to 18 ft. of water can ascend; the main supply, however, comes from the great mines of hydrous red hematite in the cretaceous formation at Somorostro, from which at present there is only a single line of rails (another is, we understand, projected, if not already commenced) to the shipping port of San Nicolas. This does not, owing to the defective means of loading from want of sufficient quay room, and the customs regulations which prohibit night work, admit of more than 1300 tons per day being loaded, so that there are at present no hopes of exporting more than between 400,000 and 500,000 tons per annum; yet it is notorious that about 600,000 are already contracted for for delivery this year, and the port is already crowded with vessels waiting their turn, and incurring enormous sums for demurrage, which, in greater part, will fall on the charterers in England, so that the cost of the Bilbao ore, when delivered in Welsh or English ports, is out of all proportion high, owing to these impediments in the way of getting the ore from the mines placed on board the ships. The inauguration of the mineral railway from the mines of the Bilbao Iron Ore Company, at Galdames, to the mouth of the river of Bilbao, at Sestao, took place on the 30th January, and the works are being vigorously prosecuted.

Another English company, called the Spanish Hematite Company, has commenced working of the San Miguel Iron Mines, near Irun, in the province of Guipuscoa, with the object of exporting hydrous hematites and spathic carbonates of iron to England and France. The mines of this district, or of the Bidassoa, as they are usually termed in France, exported to that country, before the stagnation in the iron trade of France, caused by the war with Germany, about 1500 tons of iron ore per month, and are again attracting attention. Their development hitherto has been retarded mainly for the want of railway communication from the mines to the shipping port.

The Santander Mining Company has also been brought out, with the object of acquiring and working certain iron and other mines in the north of Spain.

SWEDEN.

The present high prices for iron, and especially so for the higher qualities of charcoal iron, have, as might be expected, done good service to the Swedish ironmasters, who have made every effort to increase this production to its utmost; this being, however, limited by the annual supply of charcoal which can be procured from the forests, has not allowed of being much augmented, either by any considerable extension of the present or by the erection of new works for the production of charcoal iron; attention has, therefore, been directed to the utilization of the superabundance of rich iron ores in the central iron district of Sweden by exporting them to England and Belgium, and also on a smaller scale by smelting the iron ores on the spot with coke from England, brought over as return freight by the ships which will carry iron ores to that country.

Arrangements are, it is understood, now being made, both on English and Swedish account, for working the iron mines located along the line of the new Swedish Central Railway, and for exporting the ores as soon as that railway is opened for traffic, which is expected to be some time this summer. The quality of these ores is unexceptionable, and in richness they vary from 50 to 60 per cent. metallic iron. Although less prices have been announced, it is not probable that these ores can be delivered on the east coast of England, owing to the long overland carriage, under, at the lowest, 25 per ton.

An English company, entitled "The Swedish Central Iron and Steel Company, Limited," has been established, and commenced operations with the twofold object of working both charcoal and coke furnaces in connection with Bessemer steel works and rolling mills. At Bjorneborg, in the western part of this district, their operations are confined to the manufacture of charcoal iron for the production of Bessemer steel plates and tires of the finest quality; whilst at Frotuna, two large blast furnaces are in course of erection for smelting iron ores brought from the iron mines situated along the Swedish Central Railway, from which an ample supply can be had at extremely low prices. The fuel to be employed is coke from England, and the product, after conversion direct from the furnaces into Bessemer steel, is to be rolled into rails for consumption in Sweden and exportation to Russia and Germany. The richness, purity, and cheapness of the iron ores, the magnificent water power, and ample supply of cheap labor at command, and the proximity of the markets for the manufactured products, are advantages which are expected to more than counterbalance the extra expense of the combustible, and are considered to insure the success of the undertaking.

The Suez Canal Company, at its meeting of March 4, 1872, resolved to so modify the tariff for vessels passing through the canal as to levy a toll of 10 francs per ton on the real capacity of ships, instead of on the legal capacity determined by the number of gauged tons, as heretofore—in other words, to substitute English admeasurement for French. The Tribunal of Commerce of the Seine, on the suit of the Company of the Messageries Maritime, decided, at its sitting of October 26, that this action of the Suez Company was not founded in justice, and therefore illegal.

An easy method of neutralizing the effect upon workmen of the fumes of nitric acid, given out in the scouring of metal ornaments to be gilded, is announced in a paper read before the Paris Academy of Medicine. The antidote consists in keeping an open bottle of ammonia in the workrooms where the gilding is carried on.

A plan for the strengthening of buildings has been introduced in Boston by a California architect. It provides for the insertion of iron uprights an inch in thickness, and one-third as wide as the wall is thick, at intervals of ten feet in every front and side wall, with cross-bars holding the four walls together and running through the floors, strap-iron being used at intervals, and bound in with bricks.

Zinc is used very entensively as roof covering in France, Belgium and Germany. The area of roofs annually covered with this material is from 40,000,000 to 50,000,000 square feet.

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Proposals For Iron.

OFFICE OF THE N. J. & C. R. R. Co., NATCHEZ, MISS., Jan. 15, 1873.

Proposals will be received by the undersigned until the FIFTEENTH DAY OF FEBRUARY NEXT, for 200 tons of 35 pound iron rails, of the fish-bar pattern, to be paid for in U. S. currency. Also for 200 tons or more of 35 pound iron rails, of the fish-bar pattern, to be paid for in Adams County Bonds, (first and second coupon off.) (The said bonds bear an interest of 7 per cent. per annum, payable annually, the principal being payable in 15 years from date, (the bonds are dated July 1st, 1871,) and principal and interest payable at the Bank of America, N. Y.) Or proposals will be received for 400 tons of said iron, one-half to be paid in U. S. Currency, and the balance in said Adams County Bonds. The proposals to state at what time the said iron will be delivered, and the price of same, f. o. b. vessel to New Orleans; or, if the iron is already in New Orleans, the price of the same there. Proposals will also be received for fish-plates, bolts and spikes sufficient to lay the iron bid for. To be bid to state the size of the bolts and plates (the spikes to be ⅝x¾ inches) and the quantities of each and price. Bids for any other quantities than above named will be entertained. The undersigned reserving the right to reject any or all bids.

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☞ Sale to commence at 10 o'clock, a. m. and close at 2 p. m., when conditions will be made known by

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FELIX LANDIS,
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BOSTON, Nov., 20, 1872.

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No. 203 Walnut Street, Harrisburg, Pa

The Iron Age.

New York, Thursday, February 6, 1873.

DAVID WILLIAMS . . . Publisher and Proprietor.
JAMES C. BAYLES . . . . Editor.
JOHN S. KING . . . . Business Manager.

The Iron Age is published every Thursday morning, at No. 80 Beekman Street, New York, on the following terms:

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Semi-Monthly..... 2·00 "
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Rolling Mill Boilers.

Elsewhere in this issue we publish the particulars, as far as received, of boiler explosions in three rolling mills, situated respectively at Pittsburgh, Conshohocken, and Syracuse. We have no specific information as to the cause, but as the fault does not, in any instance, appear to have been in the boilers or in their management, it is probable that the cause of the disasters will be found in the imperfect manner in which the boilers were suspended. However this may be in the present instances, the absence of adequate supports, properly disposed, has been a fruitful source of danger to rolling mill boilers. A very large proportion of the explosions which have occurred in such establishments have been directly and unmistakably due to this cause, and a few suggestions on this subject may with propriety be offered at this time.

It is not an unusual thing for rolling mill boilers to be set without any center support, resting merely on brick work at each end, and as the effect of heating them continuously, night and day, is to expand their bottoms, particularly in the direction of their length, with no corresponding expansion on top, their form becomes changed, curving upward at the ends. Under these circumstances it is not to be wondered at that boilers break down and crack near the center, and it would be no cause for astonishment if explosions were of more frequent occurrence than they are. In other cases they are hung with three points of suspension, one at either end and one in the middle. The crowning up at the ends thus throws the whole weight of the boiler and its contents upon the middle support, and if this gives way the boiler is almost certain to part in the girth, and if one boiler in a battery bursts from this cause the others are likely to do the same, though with somewhat less violence. We could mention half a dozen disastrous explosions in rolling mills, resulting from the breaking of the center supports of boilers, and have visited many more where such accidents are liable to occur at any moment. To insure any degree of safety, every rolling mill boiler should have supports at least once in 10 feet, and the points from which they are supported should be very secure, for if there is variation here, the weight of the boiler will not be evenly distributed. The expansion and contraction alluded to above throws the weight off from some supports on to others, and something must be done to overcome this. Various devices are suggested, but those in actual use and working well are best to follow.

In the accompanying illustrations are shown several ways of supporting rolling mill boilers. In Fig. 1, a piece of iron is riveted on the inside of the boiler, a tapering or conical hole is drilled through this and the boiler plate, and a heavy bolt or rod with conical head which fits into this hole, steam tight, forms the point of support for the boiler. In Fig. 2, a strap is riveted on the outside of the boiler, on the top of which is an eye. Into this eye a firm rod is hooked or fastened.

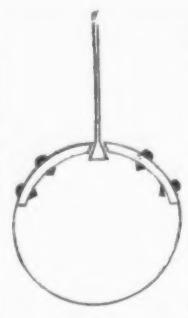

Fig. 1.

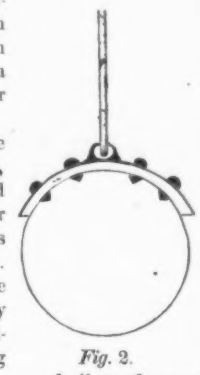

Fig. 2.

In Fig. 3, there are two points of support, one on each side, and it is superior to either of the others, but is not as frequently used. To compensate for the variations caused by expansion of the bottoms of very long boilers, the supports between the ends are arranged to rest upon springs. Volute springs are often put under the ends of the beams where each boiler has an independent setting, then if the ends are thrown up, and the weight brought upon the center or intermediate supports, the springs yield and throw the weight back again in due proportion upon the ends. In some instances, iron manufacturers have gone to the expense of adjusting the intermediate, or central, supports by means of lever and ball resting upon a knife edge, thus distributing the weight very evenly, each support responding instantly to any variation in form of the boiler from expansion.

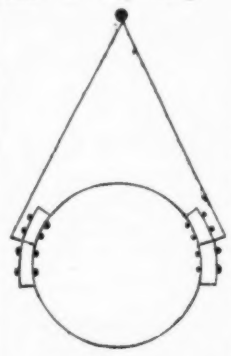

Fig. 3.

Too much attention cannot be given to this subject. The settings of boilers subjected to intense and continuous heat soon get out of repair, and if they do not receive proper attention the boiler settles out of place, is liable to unequal strains, is weakened, and rendered dangerous. Rolling mill boilers are generally run at very high pressure, and should therefore be kept in the best possible condition; and with so many terrible examples of the consequences of ignorance or neglect in the setting of boilers before us, it is evident that our iron-masters owe it to themselves and to their employes to look carefully after their boilers, and see that they are properly supported in every instance.

The American Institute.

In another column we print a communication from the Chairman of the Reform Committee lately organized to prevent the further continuance of alleged abuses in the management of the American Institute. The character of these abuses is very distinctly set forth by Mr. Walker, and if his statements are correct, there can be no doubt that the Institute needs a thorough reorganization. If the reformers are in error, the present managers owe it to themselves to place before the public, without delay, a full and specific account, down to the smallest item, of their stewardship. No unintelligible statement presented without proofs and vouchers, no broad denial, no general talk about the "glorious future of the American Institute," such as we have too often heard, will satisfy the public. The Institute is not a stock corporation, to be run for the benefit of stockholders, but a trust placed by the people in the hands of its managers for the promotion of science, industry and the useful arts. If in any way the funds have been diverted to other uses than those provided in the charter, a charge of bad management, if not of corruption, is fully justified. Even the non-employment of moneys that should be used in increasing the library, or in promoting the diffusion of useful knowledge, is, in such an institution, but little less than a crime, and should bring upon the officials the severest condemnation.

The control of the Institute, whatever may have been the case in reality, has always been legally in the members acting at the regular monthly meetings. As the property belongs to the members at large, and not to the officers, who, it seems, have perennial place in office, it may be properly asked why the membership shall not be allowed to control it? If there is nothing wrong in the designs of the party in power, why do they desire to deprive the members of any voice in its management, except through and subject to a board of officials who, from all accounts, have in their projected change of the by-laws made no provision whatever against their own malfeasance, and provided no remedy for corruption should the temptation to be corrupt prove too strong for them?

Another thing which should not be tolerated for a moment in a democratic country, is the attempt to "gag" the reformers by denying them the right to make a copy of the list of members. This list is a part of the records for the keeping of which the reformers, in common with other members, have paid, and there can be no excuse whatever for a measure which evidently has for its aim the giving of the managers an undue advantage over the opposition by depriving the latter of a just and equitable method of placing both sides of pending questions before the voters of the Institute. This measure might be effective were it not that the newspapers are likely to give the reformers all the opportunity they need to reach the membership of the Institute, and in the impending struggle between the members and the "ring" there can be but little doubt as to which side will secure the support of public opinion. Of the charge that profanity and foul language have been permitted in the presence of officials and employes without rebuke, we have but little to say. We hope there is some mistake in this, at least; but if the assertion is correct, the offending servants of the Institute, however old or long in its employ, should for the sake of decency be at once retired to private life.

We trust the whole management of the Institute will be fully ventilated before the matter is allowed to drop. If the reformers abandon the position they have taken, the officers will need no other vindication in the eyes of the public, and similar movements in future would be regarded as efforts on the part of discontented members to win notoriety and force themselves into offices to which, in the natural course of affairs, they would stand but little chance of being elected. This is something more than a mere family quarrel. The public are interested, and the popular demand is that the truth shall be known, the right triumph, an institution which we have learned to respect and value as a public benefit be purified of all taint, and its management placed above suspicion.

A Story with a Moral.

Let those who use explosive compounds take warning from the example of certain gentlemen in Missouri, whose experiences are recounted by the St. Louis *Republican* of recent date. The story runs as follows: Some time ago a firm engaged in rock excavation bought a quantity of dualin for blasting purposes, but when it was delivered to them they were sorely puzzled to know what to do with it. They were afraid to use it, or their men were afraid, and they did not like to keep it around. To bury it was out of the question, for fear some one might violate, intentionally or by accident, its last resting place, and thus create a most unexpected and disastrous volcanic eruption. No one would buy it, and they did not think it expedient to explode it—indeed, they were afraid it might solve the problem for itself by vanishing into thin air, and carrying a part of the State of Missouri with it. They had called up a Frankenstein that would not "down" at their bidding, and great was their anxiety of mind in consequence. At last one of the gentlemen of the firm—with a heroism only second to that of Curtius, though with a disregard of the lives and property of others which was only equaled by that of Samson at Gaza, when he committed suicide by pulling down the house of his captors—volunteered to take the stuff to St. Louis and see if he could sell it. He brought it down by boat, and, reaching St. Louis, locked the uncomfortable case in his stateroom while he went about seeking some one to whom, for a consideration, he could transfer the disagreeable responsibility. But no one was contemplating investments in dualin just then, and the custodian of the earthquake was more at a loss than before. He did not dare to take it back again, and would not have known what to do with it if he had it back, so in his desperation he gently lowered it overboard, gave a sigh of deep relief, and started for home by the first conveyance.

But the end of the story is yet to be written. It is well known that the explosive power of dualin is not diminished by moisture, and that its ability to create earthquakes is small in comparison with its ability to raise water spouts; and the anxiety of which the proprietor of the dualin in question relieved his own mind, has settled down upon the minds of sundry river pilots and steamboat owners. There is no telling to what point the current has swept the torpedo, nor when nor where some ill-fated craft may run afoul of it, and start forthwith on a voyage skyward.

Moral.—Do not buy dualin until you know just what you are going to do with it.

In a very sensible and well-considered editorial on the condition and prospects of the iron trades, the London *Times* says: "We do not believe that the prices or the "wages, either in the iron or the coal trade, "which have prevailed during the last six "months, can be maintained." It sees an inevitable crisis impending in these trades, for the reason that, with increased wages, the men have done less work than formerly, and work of a generally inferior character. "The result," says the *Times*, "has been a "national loss as well as a reduction of the "trade of the coal and iron masters; but at "the moment that the latter are referring "to the conditions of their trade as com"pelling a reduction in the rate of wages, "they must allow workmen the privilege "of using favorable conditions in the way "that promotes their own ideas of happi"ness. We should be glad if the present "dispute were, in some instances at least, "made the means of preventing the re"proach that increased trade means only "increased idleness and debauchery." Whether the crisis which the *Times* predicts will come before the "national loss" is so heavy that it cannot be made good, remains to be seen. We do not believe that England could long maintain her preeminence in the production and exportation of iron and manufactures of iron, in competition with this country, under the most favorable conditions of cheap labor; but with continual conflict with their men, the position of her ironmasters is one which gives but little promise of improvement in the future.

A bill has been introduced in the Senate by Mr. Wilson, incorporating the New York and Chicago Sphere Pneumatic Tube Company, for the construction of a tube road between the cities named, through which hollow spheres, carrying mail matter and freights, are to be propelled by pneumatic pressure. The capital authorized is $40,000 per mile, and the company are permitted to issue as many bonds as they choose. We think equally satisfactory results would be reached by a system of mortar transit, by which spheres could be propelled by dynamite, pudrolith or nitroglycerine charges from station to station. It is not likely that either would cost in the long run more than four or five hundred times as much as a railroad, in proportion to capacity for freight movement.

The letter of our English correspondent, which appears in another part of this issue, contains much interesting information relative to the great South Wales strike, and to labor movements in other parts of the United Kingdom. It will be read with interest.

Scientific and Technical Notes.

THE PLATING OF COPPER, BRASS AND GERMAN SILVER WITH NICKEL.

Experience has proved that among all the salts of nickel the "sulphate of ammonia and nickel" is the most suitable for electro-plating purposes. The well known chemist, Prof. R. Bœttger, in Frankfort-on-the-Main, says in the *Polytechnische Notizblatt*, that as long as thirty years ago, he described exactly the same process which is now in use, and expresses his surprise that patents could have been granted to other persons for this discovery. The account referred to appeared in 1843 in *Erdmann's Journal fuer practische Chemie*, and has been republished by Bœttger in No. 12, year 1872, of his own paper.

A singular patent has been granted to a Mr. Baldwin, in London, It relates to

COMPOSITIONS FOR PREVENTING INCRUSTATIONS IN BOILERS.

One of them calls for 40 parts hypochloric acid, 10 oxide of nitrogen (!), 10 oxalic acid, two caramel, one palm oil, and 38 parts of distilled water. The second calls for 80 parts vermouth salt, 10 sal-ammoniac, five oxalate of ammonia, one almond oil, one carbolic acid, and 50 distilled water. Mr. Baldwin's chemistry is as remarkable as his knowledge of boiler incrustations must be profound, and we hope he will make haste to patent his inventions in this country. We should be sorry to see them pirated.

Landauer has investigated the reactions occurring when different metallic compounds in form of powder are subjected with hyposulphite of soda to the flame of a blow-pipe, and has founded on them

NEW BLOW-PIPE TESTS,

which are explained in the following table:

Oxide metals.	Deportment to hyposulphite of soda.	Deportment to borax on the platina-wire. (In the cold pearl.)	
		In the oxidation flame.	In the reduction flame.
Oxide antimony	red.....	colorless.	gray to colorless
Arsenious acid	yellow	o	o
Oxide lead.....	black....	colorless.	gray to colorless
" chromium	green....	yellowish green..	emerald green....
" iron.....	black....	yellow..	bottle green....
" gold.....	black....	Is reduced without being dissolved	Is reduced without being dissolved .....
Oxide cadmium	yellow ..	colorless.	gray to colorless
Protoxide cobalt	black....	blue	blue.....
" copper	black.	blue	brown red (turbid)
Oxide manganese	brown gr'n	violet...	colorless .....
Molybdic acid....	brown..	colorless.	brown.....?
Protoxide nickel	black....	red brown	gray to colorless
Oxide platina....	black ..	Is reduc. without being dissolved.	Is reduced without being dissolved.....
Oxide mercury ..	black....	.....	.....
" silver.....	black....	colorless.	gray to colorless
" uranium..	black....	yellow..	bottle green.....
" bismuth .	black....	colorless.	gray to colorless
" zinc	white...	colorless.	gray to colorless
" tin.....	brown....	colorless.	colorless .....

We would remark that the colors in the second column are obtained on heating the metallic compound in a test tube with the hyposulphite of soda. As this substance contains a good deal of water, the tube should be held horizontally and be closed with cotton, so that the water can be absorbed.

In the Academy in Paris, E. Daniel has recommended the following process for

DECORATIVE PAINTING ON TIN FOIL.

The thinnest kind of tin foil is spread out upon a plate of heavy glass, previously moistened. On this surface one may paint in oil, as on plaster or on wood. When dry and lacquered, the foil is taken off from the glass and rolled together like tapestry, if not to be used in the place where made. Before applied, the surface to be decorated is coated with a waterproof paint, and when to be placed on decorations of wood, gypsum or stone, the paintings are to be cut out. In consequence of its great flexibility, almost any ornaments in *alto* or *basso relievo* can be lined with it. Gilding may also be replaced by this system of decorative painting, as it is only necessary to paint with gold on the foil. The specimens on exhibition in the Academy excited great interest, and the French chemist, Dumas, considers this new art of great importance, the more so as the Chinese, though in a somewhat modified manner, have practiced it successfully for a long time.

The well-known chemist, Puscher, in Nuremberg, calls attention to the fact that a concentrated solution of the anhydrous stearate of alumina in turpentine forms an excellent

VARNISH FOR METALLIC ARTICLES

which are to be exposed to a high degree of temperature. Although not sharing the brilliancy of damar varnish, it distinguishes itself by a higher degree of flexibility and resistance to heat. It is prepared by adding alum to a thin solution of castile soap as long as precipitation takes place. The precipitate, consisting of a water-holding alumina-soap, is first washed out with hot water, and then warmed until dry. It becomes thus transparent like glycerine soap. When dry, it can at once be dissolved in turpentine. The soap to be used should be a yellowish, resinous castile soap.

M. Hannel lately presented to the French Society of Aeronauts some observations upon the flight of birds which he regards as having an important bearing upon

AERIEL NAVIGATION.

He assumes that, during normal flight, the speed of the center of movement of the wings is constant, and equals 1·15 metre per second. This center of movement is situated on the line which divides the triangle representing the wing in two equivalent parts. The weight which a bird can support without fatigue may increase, according to circumstances, up to one-half of its own weight, the mean value is equal to one-fourth of this weight. The total load, that is to say, the weight of the bird, increased by the weight that it can carry, is thus, on an average, equal to five-fourths its proper weight. The relation between the total load and the breadth of wing is

$$x = y \log. 500, \quad \text{or,} \quad x = y\,269897.$$

In this formula x represents the total load expressed in kilogrammes, and y the breadth of the wing in metres. This formula can be applied to insects as well as to birds. Supposing this formula to hold good for all bodies passing through the air, and carrying with them their motive power, the application of it can be made to a man and a machine. For a machine weighing 3·5 tons, the spread of wing should be 23 metres, and 5·5 metres for a man, weighing with the necessary appliances 100 kilogrammes.

The French National Society for the Encouragement of Industry offers, among others, the following

PRIZES FOR USEFUL INVENTIONS,

made between and including the years 1873 and 1878:

The 2000 franc prize (1873) for a steam launch 40 or 45 ft. long, working at 9 knots an hour in still water, and carrying sufficient fuel for 12 hours, working at maximum speed.

A prize of 3000 francs (1876) for a steam engine of from 25 to 100 horse-power, burning as a maximum in full work 700 grammes of coal per horse power per hour, weighing less than 300 kilo. (660 pounds) and costing from £12 to £16 per horse power. During trials the competitors will be at liberty to make use of any kind of fuel and system of generation which they prefer.

A prize of 1000 francs (1873) for the best domestic engine, designed with the special object of assisting home work in towns.

A prize of 4000 francs (1873) for progress made in the process of hemp and flax spinning. This prize will be awarded to the manufacturer who shall, on a production of more than 20,000 francs' worth of yarn, effect an economy of 15

per cent. on the power employed, and a degree of fineness exceeding 150,000 ft. per pound for the flax, and 20,000 ft. for the hemp.

A prize of 2000 francs (1874) for preparing fibres, hitherto subjected to carding.

A prize of 3000 francs (1875) for a file-cutting machine. The cutting tool of this machine to have a form mathematically true, to act without shock, and not to be liable to excessive repairs. The cost and maintenance of this machine, its production, and the driving power acquired, must be such that the results obtained offer sensible advantages over those obtained by hand work.

A prize of 5000 francs (1873 to 1875) for a practical and cheap means of dressing millstones, so as to remove the existing dangers of this industry. This prize was founded by subscriptions made in La Ferte-sous-Jouarre.

In the chemical arts prizes are proposed for the wholesale manufacture of oxygen and nitrogen; the utilization of waste materials; the production of graphite suitable for pencils; for a treatise on steel manufacture, based on certain experiments, and having for its object improvement in the steel manufacture; for a process capable of disinfecting and clarifying promptly and efficiently the water of sewers, &c.

Other prizes will be awarded for an electro-magnetic machine; for a system of heating houses and apartments, with constant circulation; for a process of meat-preserving; for drying wood; for an industrial application of the spectral analysis, &c.

Amongst the agricultural prizes we may mention one of 6000 francs for steam culture, and one for the best means of distributing powdered manure.

In the section of the Beaux Arts there are two entries, one (1874) for the manufacture of good photographic paper, the other (1873) for a process to produce photographic electrotypes which may be printed from in a common press, and used instead of wood engravings.

English Coal Getting.

BY JAS. A. WHITNEY, M. E.

In a recent investigation concerning methods of applying compressed air to motor purposes, there were brought to my notice some items concerning English coal "getting," or as we would term it, mining, which may constitute the subject matter of the present article.

Whoever will consult the older technical Cyclopedias, will find in the description of British coal mining as vivid pictures of the physical degradation to which humanity in the pursuit of daily bread can be brought. The thin seams, often not more than from twenty to twenty-four inches in vertical thickness, necessitated not only the severest labor in loosening the coal, and that, too, in the most constrained position, but the transport in trollys of the broken product through long and intricate ways of no greater hight, and often up small ladders in receptacles borne upon the head and back. From the limited space children were found in many instances the most profitable to employers; but the rude wood cuts of the illustrated articles in the authorities referred to show with grapic plainness the employment of women for trolling on their hands and knees the laden trollys, and for carrying the coal by a strap passed over the forehead, for holding the load upon the bent back, up the steep rough ladders leading from the depths. Abroad, as here, improvements in coal mining seem to be among the most difficult of adoption, but an English journal before me states that during the past four years machinery actuating wire-rope to one or another of half a dozen systems, is now quite generally adopted for working the coal-cars. Aside from the manifest humanitarian aspect of the case, the successful introduction of trolly-hauling mechanism under the disadvantageous conditions of their seams, suggests its wider application in American mines, not only of coal, but of cinnabar and silver, where the drifts range from four to six feet in hight and from three to five in width.

Coal "getting" involves in English practice the "undercutting" of the mass to a distance of several inches, and its subsequent dislodgement by wedges or by the disrupting action of gunpowder. The undercut, made by manual labor, is a groove or opening of triangular form and varying in size according to the character of the coal; but more especially according to its hardness. Its vertical space may be averaged at from nine to twelve inches. To make the undercut by machinery has been attempted in many ways during a period extending back to 1789, in which year the first invention for the purpose was patented. It is only within the last five or six years, however, that mechanism has been successfully applied. This was by the West Ardsley Coal Company, and the apparatus itself, as just indicated, the first of its kind proved good for anything, is worthy of special description.

The working parts were carried on a strong horizontal framework of cast iron, itself supported on four flanged wheels fitted to run on the ordinary tracks of the drifts. The axles of one pair of wheels were connected by suitable gearing with a screw extending back to the rear, and furnished with a handwheel. By turning the latter the machine was worked forward when in use to feed the pick to the coal as the "undercut" deepened in the cutting. The pick, patterned after the ordinary miners' implement, moved in a horizontal plane, its helve being attached to a vertical rock-shaft, to which motion was given by the direct action of an oscillating engine carried on the frame, and operated by compressed air in lieu of steam. When working in seams three feet or more in thickness, the operator sat on a seat provided on the rear of the frame, but in thinner seams a small truck running on low wheels was attached to the machine; on this truck the operator was obliged to kneel in working the machine. This apparatus made one undercut of three feet horizontal depth, with but two and one-half inches opening; and the coal brought out, owing to its better condition, was worth about one shilling per ton more than that got out in the usual way.

The apparatus just described was found of too great length for easy turning on curves, etc., and a second was made, having a hight of 2 ft. 2 in., and a length of 3 ft., the pick being 2 ft. 6 in. long. This differed from the other in having a fixed engine cylinder, with a trunk-piston, thereby enabling the length to be diminished. According to the authority before me, either of these machines was "guaranteed to undercut a seam of coal to the depth of 3 ft. and to the length of 150 yards along the face of the coal, in eight hours." Compressed air, after an experience of eighteen months, confirmed its superiority. The air was pressed into a receiver on the surface, by an ordinary steam engine, to a pressure of from 45 to 50 pounds per square inch, and led down the shaft, 80 fathoms deep, in 4½ inch pipe; from this, in pipes of diminishing diameter, in the several directions of the workings, and finally to the working faces by India rubber tubing 1¼ inches in diameter.

Notwithstanding the success of, real or alleged, this machine, the subject was considered so indefinitely solved in 1867, that a powerful association of coal owners offered prizes for new machinery capable of operation in seams varying from 2 to 9 ft. in thickness, and with a dip ranging from the horizontal to an angle of 20°. Also, to work on usual tracks of from 1 ft. 6 in. to 2 ft. 3 in. gauge, and in conjunction with the ordinary wagons or trollys, 3 ft. 6 in. by 3 ft. 3 in. hight. Compressed air was specified as the only motive power permissible.

Beside picks operating by percussion, chisels slicing off thin sections of coal much after the manner of the cutting tool in an iron planer may be used, and machines embodying this principle constitute a separate class of coal-getting mechanism. As to whether they offer any advantage over the others, I have no data to determine, but reasoning *a priori*, there seems to be much in their favor. Some projected apparatus have comprised rotary cutters, but none of those that have come under my eye have had much merit in them.

In this country the introduction of coal-getting machinery will doubtless be long delayed, by causes wholly apart from its mechanical success, but that the actual results of the labor of a given number of operatives could be multiplied many times by the use of mechanism, already satisfactorily tested abroad, seems plain from the data afforded by writers most familiar with British coal-getting.

Mismanagement in the American Institute.

To the Editor of The Iron Age: I wish, through your columns, to call attention to the present condition of the American Institute and the earnest and energetic efforts now being made by its best members to secure reform.

For years past the control of the Institute has been in the hands of parties who, by one scheme and another, have continually re-elected themselves to office. The result is that the expenses of the annual exhibitions have increased from six or eight thousand dollars per year to more than twenty-five thousand, as witness the following schedule:

Ground rent of forty lots—the Rink proper	$13,000 00
Four lots on Second Avenue	1,000 00
Insurance on Rink	2,500 00
Taxes on building and land	3,050 01
Interest on $25,000 at 7 per cent	1,750 00
Rent on Rink, 6½ years, at $25,000.	3,846 15
Total	$25,146 16
Rent for one week	$483 58
Rent for one day	69 08

But nothwithstanding this quadrupling of the expense, the last fair was superior in every respect to its predecessors. Concerning this there is also another item. In their report, the trustees claim a net profit of several thousand dollars for the recent exhibition, but when the question was asked whether the rent of the rink had been included in the statement of expenses, no answer could be obtained. If it was not so included, then the fair must have occasioned a financial loss to the Institute. But the fog thrown upon this matter is only an example of the general policy of the present management. No person can obtain to-day any reliable account of the moneys received or paid out, and it is confidently believed that charges of most miserable mismanagement and reckless waste, not to say of foul and staring corruption, can be sustained.

But there is another than a financial aspect to the present state of the Institute. It was organized for the promotion of science and industry, but its library is 10 years behind the times, none of the new volumes on either art or science finding a place on its shelves. The chairman of the library committee lately declared that not another book should be bought until the Institute elected a special librarian. There is now at the rooms, a librarian, who also acts as clerk; an assistant clerk, and a messenger, who has very few messages to carry. The idea is simply to bully the Institute into making a salaried position for some favorite of the ring. As to the general management of the rooms, it deserves the most thorough condemnation. Not more than one-half the space is properly availed of, nearly the whole of one of the rooms (on the first floor of the Cooper Union) being used for the storage of boxes and other trash, at an expense to the Institute of nearly $800 a year. The same space for storage could be had in any fitting localty for $50 to $100 a year. There is even worse to be said of the general conduct of the rooms, for obscene language and profanity have in more than one occasion been allowed, without rebuke from the attendants, to an extent that should disgust every person of gentlemanly instincts having occasion to visit the place. Furthermore, there have been instances under the present regime, and of no remote date, in which personal violence has been threatened by prominent members of the ring. The monthly meetings of the Institute, which have been wholly controlled by the ring, have come to be currently characterized as "bear-gardens" from the bullying, and gag-law practiced by the ring demagogues..

One would think that after establishing such a record, the present managers would be content to be let alone, but made mad by immunity from punishment thus far, they have dared to attempt to legalize their proceedings by trying to subvert the time-honored regulations of the institution, and force the adoption of a set of laws of their own making. These proposed by-laws abolish the monthly meetings, place the entire control of the Institute in the hands of an irresponsible board, who are to have power to buy and sell, at their own sweet wills, and accounting to nobody; who are to appoint all inspectors of election, and who shall hold over in case of a non-election, or in case the results of an election are not declared by the inspectors. These iniquitous regulations, and others of like kidney, were sought to be forced through at the last monthly meeting. To secure their legal adoption a two-thirds vote of the members present was necessary. As an actual fact, as noted by members present, the vote stood 55 for and 44 against the proposed change. Notwithstanding this, the measure was declared by the chairman, F. A. P. Barnard, L.L. D., S.T.D., etc., etc., to be carried, and in spite of repeated calls for a count, or ballot, a hurried motion to adjourn was made, caught up by the chairman, and declared carried.

In conclusion I will mention an illustration of the tactics employed by the ring to keep the membership at large from a true knowledge of the existing state of affairs. There is no printed list of the members since 1868, five years ago. Wishing to address the membership with regard to matters so vital to their interests, the reform committee desired to make a copy of the list kept at the rooms as a part of the records. This was insolently denied, and the reform committee has been compelled to take legal steps, in order to enable the membership to receive, by mail, any other information than the ring, in its usurped and illegal authority, chooses to impart. Respectfully,

HORATIO B. WALKER,
Chairman Reform Committee.

Analysis of American Ores for the Centennial Exhibition of 1876.

The following will be found of interest to iron masters, and to the owners of iron mines throughout the country:

THE IRON MASTERS' LABORATORY
No. 339 Walnut Street.
PHILADELPHIA, December 3, 1872.

Hon. Daniel J. Morrell, Chairman of the Executive Committee of the Centennial Commission. Dear Sir: Since my conversation with you, in October last, in reference to collecting Iron Ores for the exhibition in 1875, my time has been almost incessantly occupied with analytical work in the laboratory, and really not a moment, before to-day, have I had to comply with your suggestion.

The subject calls for mature consideration. All that I can do now is to present, in crude form, the views I hold, and in doing so, hope to bring the subject before the committee for early discussion and action. It is true that three years and more are at command, but this is quite short for so large a work as collecting, arranging and analyzing the various ores, or the most important of them, of such a country as ours, and putting the information gathered therefrom into a form to be of practical value. The time is only *too short*. My connection with this laboratory and varied experience as an analyst of ores of iron, enable me to say this very positively.

If I can aid further in the work, I would be glad to do so

Very respectfully, your obedient servant,
(Signed,) J. BLODGET BRITTON.

The samples should be fair average ones, not picked specimens, weighing not less than fifty pounds each, collected from the principal ore banks or mines in every State and Territory. In some cases it would be advisable to have larger samples, and some fine choice lumps, as large as could be conveniently transported.

All the *leading* and *characteristic* ores should be quantitatively analyzed. Each sample should be in an open box, and labelled with the name and location of the mine from which it came. If analyzed, the results should be given, and such other information as may be deemed important.

The samples should be arranged and classified, first as to States, and second as to their mineralogical names and chemical constituents, so that each could be readily found and inspected, and their practical and metallurgical value correctly judged of.

The information concerning each sample should be duly recorded, and the record of the entire collection carefully and systematically arranged and published for future reference. The publication had better be ready at the opening of the exhibition.

For the performance of the work—

A commissioner of iron ores should be appointed, whose office and post office address should be in Philadelphia. He should possess scientific knowledge, be familiar with the various kinds of ores, competent to correctly classify them, and direct the methods of their analysis, and possess energy and enthusiasm in the performance of his duties. One such commissioner (exclusively for the ores of iron, and not under and subject to the dictation of any other commissioner) would be sufficient. Local commissioners or agents should be appointed in each State, perhaps best by the governors thereof (the chief commissioner might aid by suggesting who would probably be the most competent and enthusiastic), whose duty should be to collect samples of ore, each within his own State, and forward them to the address of the chief commissioner. Many private individuals, owners of ore lands, iron masters and others, no doubt, would aid largely in the work.

A laboratory, with competent assistants for making analyses, and ample room for receiving and temporarily storing the samples, should be established in Philadelphia.

The work of analyzing would be necessarily somewhat slow and very laborious; but it should be thoroughly well done and reliable for practical metallurgical purposes, at least so far as it was done, or not attempted. It should be commenced *as soon as possible*, for it would take all of three years, even with the aid of a number of assistants.

The commissioner, if he possessed energy and system in doing business, could, by addressing the several governors, and sending addresses and letters of instruction to each State for publication, etc., soon set the work of collecting into active and successful motion. Much of the collecting and some of the analyzing might be made to fall on the several State geologists and their assistants. Some, and perhaps many, of the owners of ore lands would willingly pay the expense of transporting and analyzing their own ores, no greater charge being made than the actual cost. Some of the State legislatures would probably make appropriations to meet the expenses attending ores from their own State.

All plans and arrangements for expediting the work and saving expense should be thrown on the chief commissioner as his special duty.

But, I repeat, the work, all of it so far as was done, should be really well done, with the single object of faithfully serving and advancing the iron industries of the country, and if so done, the benefits that would result therefrom, I conceive, can scarcely be overestimated, for few, indeed, have any adequate conception of the magnitude of our iron mineral resources, and how much the future wealth and happiness of the nation depends upon their full development.

As to the expense, I will not attempt to make any estimate of it. I believe, however, that by judicious management, much of it would be borne by iron masters and others individually interested or benefited.

According to a statement made by Dr. Percy, it took two expert analysts, assisted to some extent by others, between two and three years to analyze less than one hundred and sixty of some of the most important British iron ores, selected from the collection of the First International Exhibition in 1851. I think, aided by the advancement in chemical science, we could do faster and perhaps more accurate work now. But from the statement of Dr. Percy, some notion may be got of the time that analytical examinations require.

Such a collection as this country could have in 1876 would in extent and variety make that of Great Britain appear trifling indeed.

The above communication from J. Blodget Britton to Hon. Daniel J. Morrell, Chairman of the Executive Committee of the Centennial Commission, was submitted for approval to the National Association of Iron Manufacturers, and at the meeting held January 8th, 1873, it was

Resolved, That this Association approves of the suggestion of the appointment of a Commissioner for this purpose, and recommends to the Executive Committee of the Centennial Commission the appointment of an able scientific expert to classify, analyze and describe the ores of the United States, believing the information thus furnished will be of great value, not only by increasing the development of our mineral resources, but also in attracting the attention of other nations of the world to the same. (Attest,) THO'S. DUNLAP, *Secr'y.*

The following letter has already received the signatures of several of the more prominent iron masters in the country, and will probably meet with general approval when circulated for signatures:

To the Hon. Daniel J. Morrell, Chairman of the Executive Committee of the Centennial Commission: SIR:—We, the undersigned, iron masters and others, feeling a deep interest in promoting the home production of iron and steel, and the various manufacturing interests dependent thereon, highly approve of the suggestions in the annexed communication.

The iron ores of the United States are admitted to be the best in the world, and upon them are based manufacturing industries now scarcely second, and are certainly destined to be first, in magnitude and commercial importance in the country.

That all the leading and characteristic ores of the several States and Territories should be collected and properly classified and arranged for inspection at the nation's Exposition, there can be no question; the occasion is an especially fitting one for such a display. Yet more than this should be done. To effect the most useful purposes, they, or the most important of the ores should, we feel thoroughly convinced, be fully described and carefully analyzed, and their true metallurgical value ascertained, and the results published.

If this be done, then, indeed, a work will be accomplished, we venture to say, worth to the nation many times more than the cost of the entire Exposition—a work that will surely and forcibly tell to our people and all nations what vast wealth and power our iron mines are capable of furnishing.

It would be a laborious undertaking, and require for its accomplishment all the time remaining before the exposition; but we believe it can be successfully accomplished, if commenced at once and prosecuted energetically.

If it were known that a bureau especially for iron ores was established, and a commissioner for the same appointed, we believe that an interest and enthusiasm would be immediately aroused all over the Union, and large numbers of samples would be collected and forwarded without delay, at private expense. It is plain that not till the samples were received, could the assortment and selection for analyses be made.

We therefore respectfully suggest for the consideration of the committee, whether the importance of the work does not warrant the earliest action, and whether the public interests will not be best served by the establishment of a bureau and the appointment of a commissioner, without postponing until the entire system of organization of the Exposition has been completed and an ample fund subscribed by the public. To postpone until then would probably be fatal to the accomplishment of the work in time, and that, in our opinion, would be little else than a national misfortune.

We think that beyond establishing a bureau and appointing a commissioner, with no greater authority than to receive, assort and store samples, no further immediate action on the part of the committee is essential. From the samples received portions could be selected, bottled, labelled and retained ready for analytical examination, so soon as the committee were enabled to provide the means and direct the same to be done.

We further believe that the immediate action on the part of the committee, we have here ventured to suggest, will induce many owners of ore lands and furnace men to have their own ores analyzed at their own expense, subject to the advice and instruction of the commissioner.

Thus, the great work may be commenced and conducted with the least loss of time, and the commission relieved of possibly more than half the expense. But, sir, presuming the commission will never be possessed of sufficient funds, is there not enough public spirit and liberality in this great nation to carry a work, so important in its results, to a successful issue—a work in which every section of the country is deeply interested?

We have the honor to be your obedient servants.

Boiler Explosions.

We have to record three disastrous boiler explosions, occurring within a few hours of each other, at widely separated points.

A BATTERY OF FOUR BOILERS EXPLODED AT THE AMERICAN IRON WORKS, PITTSBURGH.

About 10 o'clock, on Monday morning, a terrible explosion occurred at the American Iron Works, Pittsburgh, Messrs. Jones & Laughlin, proprietors. These works, built in 1850, are very extensive, covering 15 acres, and employing about 3000 persons. The explosion was that of a battery of four boilers, located in the central part of the powerful workshop.

The wreck was complete, the flying iron, stone, and brick carrying everything before it. So destructive was the force spent that the remains of the boiler can only be found in minute particles. The pipes and other connections were hurled to such a distance that, at the present writing, they have not been found. The loss of life, as far as can be ascertained, is 7 killed and about 30 wounded. The portion of the works which was demolished was the spike and nail factories and the sheet mill. The cause of the explosion is not given. Mr. Jones says the iron was of the best quality, and that the boilers were manufactured by one of the best boiler makers in Pittsburgh. He attaches no blame whatever to the engineer and his assistants, as they are skillful, sober, and careful men. The loss at present is estimated at about $75,000, but it is believed the proprietors will not recover any insurance, as the buildings were insured against fire only. Rebuilding will begin at once. The fate of the eleven men who were engaged in excavating a tunnel underneath where the wreck now lies, had not been ascertained at the time this account was written, The families of the mill hands, who occupied the tenement-houses adjoining, narrowly escaped with their lives, and some women and children were lacerated by the flying fragments, though none are known to be fatally injured.

Another account states that the boilers, which had been in the place where they exploded for about a year, although they had been some five years in use, were located about midway between the ends of the new mill, and were placed between the spike and nail factories, about 300 ft. from the river. They faced south, and this seemed to be the direction in which the force of the explosion principally expended itself, although the batteries were completely annihilated, and the destruction was complete at the rear and on all the sides, as well as in front. The ends of the spike and nail factories were blown down to the extent of about 25 ft., and the wall and roof of the new mill were blown away. Portions of the boilers, bricks, and timbers from the ruined buildings were thrown in all directions and to great distances. Some of the fragments were thrown a distance of three or four blocks.

BURSTING OF A FOUNDRY BOILER AT CONSHOHOCKEN, PA.

About half-past four on Monday afternoon, a disastrous boiler explosion occurred at the foundry and rolling mills of Messrs. John Wood & Bro., at Conshohocken, a village on the Schuylkill, about thirteen miles from Philadelphia. The establishment was badly damaged throughout, and one half was laid in ruins. Only a few minutes before the time of the explosion the workmen had examined the boiler, and found the valves perfectly loose, there being but three cocks of water at the time. Considering the condition of the boiler, which was regarded by everybody about the establishment as perfectly trustworthy, and the fact that it had a low water indicator, its explosion is regarded as a very mysterious affair. The day workmen had just left, and the night men were just going to work. A distance of 200 feet from the above foundry is located the Albion Print Works, where three boys were standing. A piece of the exploding boiler was forced to this place, and all three of the boys were killed, and a large part of the place demolished. The killed are H. Hummel, Jr., W. Hanna, Jas. Carroll, and the three boys just mentioned, whose names could not be ascertained. These works have been in operation for nearly a quarter of a century, and the utmost confidence placed in the safety of the boilers. A number of persons were more or less seriously injured, among whom were Wm. Kelly and Wm. Barrett, who have since died.

EXPLOSION OF A ROLLING MILL BOILER AT SYRACUSE, N. Y.

At noon, on Monday, the boiler at Geddes Rolling Mill exploded, severely injuring one workman, and slightly injuring several others. The boiler was new, and the cause of the explosion was unknown. The building and machinery was damaged to the extent of $5000.

Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, Feb. 5, 1873.

During the past week the money market has worked easily, with 7 per cent. as the ruling rate on call loans, and 6 per cent., currency, and 7 per cent., gold, the exceptions. Mercantile paper has been in fair request at 8 @ 9 per cent. for prime endorsed. The bank statement, a synopsis of which we give below, is not favorable, showing an increase in total liabilities of $469,500 and a decrease in total reserves of $1,931,400.

The gold market has been heavy and without important feature. The following shows the range of the premium;

	Highest.	Lowest.
Thursday	114	113⅜
Friday	113⅞	113⅜
Saturday	113⅝	113⅜
Monday	113¾	113
Tuesday	113¾	112⅞
Wednesday	113⅞	113¾

The Treasury programme of gold sales and bond purchases during February was published on Monday, and includes the sale of $1,500,000 on each Thursday of the month, making a total of $6,000,000, and the purchase of $1,000,000 of 5-20s each Wednesday, making a total of $4,000,000.

Government bonds have been strong throughout the week. On Friday last the new Syndicate gave notice that the books would be opened on the 4th inst. for subscriptions for the remaining $300,000,000 of 5 per cent. bonds, and closed on the 7th inst. No report has been made up to the close of business to-day of the amount of subscriptions received, but the members of the Syndicate are confident—at least, they say so—that the amount subscribed will largely exceed the amount of bonds to be awarded. The success of the Syndicate will have a good effect, and business men are interested in its operations, chiefly because of their desire to see a better demand for American securities in settlement of our trade balances abroad. Of the $300,000,000 of 5-20s to be called in, it is estimated that fully $250,000,000 are held in Germany, and it is not believed that the holders of these securities will exchange them for the new fives. If they do not, and if the new fives are taken by other investors in Europe, the effect of the negotiation will be to largely increase the amount of European capital invested in American securities, and also to increase the supply of foreign exchange in this market, which would, of course, depress gold.

The stock market has been strong during the week, with principal dealings in Western Union, Erie, Lake Shore, Ohio, N. Y. Central, Rhode Island, A. & P., Union Pacific, and Pacific Mail. The highest and lowest of to-day's prices on 'Change are given below.

The movements in foreign trade for the week are as follows:

IMPORTS.

	1871.	1872.	1873.
Tot. for week	$4,651,876	$9,596,123	$9,661,598
Prev. reported	20,937,030	22,338,894	$26,736,669
Since Jan 1	$25,588,906	$31,934,517	$36,398,267

Included in the imports of general merchandise for the week are:

Anvils	95	$1,812
Brass goods	29	4,122
Bronzes	12	1,500
Chains and anchors	97	3,524
Copper	...	41,054
Cutlery	223	75,220
Guns	43	12,155
Hardware	54	4,964
Iron, hoop, tons	24	1,771
Iron, pig, tons	641	18,043
Iron, sheet, tons	79	5,528
R. R. bars	5,742	92,654
Iron, cotton ties	396	1,104
Iron, other, tons	1,257	55,145
Lead, pigs	16,186	89,314
Lead, tons	11	645
Metal goods	208	21,394
Nails	22	1,031
Needles	16	11,335
Old metal	...	6,902
Platina	2	4,636
Per. caps	1	167
Saddlery	5	957
Steel	4,058	34,157
Silver ware	3	639
Tin, boxes	11,059	101,044
Tin, 5701 slabs	476,258	137,789
Wire	17	3,347

EXPORTS, EXCLUSIVE OF SPECIE.

	1871.	1872.	1873.
For the week	$2,636,581	$4,500,068	$5,611,700
Pre. reported	18,704,182	14,565,349	17,411,481
Since Jan. 1	$21,340,763	$19,065,417	$23,023,181

EXPORTS OF SPECIE.

Total for the week	$591,579
Previously reported	5,979 233
Total since January 1, 1873	$6,570,812

Foreign exchange is nominally quoted as follows, with the market very dull:

	60 DAYS.	3 DAYS.
Prime bankers' sterling bills on London	109¾ @ 109⅝	110¼ @110⅛
Good bankers' do	109⅛ @ 109⅜	110⅛ @110¼
Prime com. sterling do.	108⅝ @ 108⅞	— @ —
Paris (bankers)	5·23¾ @5·23⅞	5·18¾ @5·18¾
Antwerp	5·22½ @5·23⅛	5·15 @5·16¾
Swiss	5·21¼ @5·22½	5·15 @5·16¾
Amsterdam	40⅜ @ 40⅝	40⅞ @ 41
Hamburg	96 @ 96⅜	97 @ 97¼
Frankfort	41¼ @ 41⅜	41⅝ @ 41¾
Bremen	96 @ 96¼	97 @ 97¼
Prussian thalers	72 @ 72¼	72⅝ @ 72⅞

Government bonds at the close were firm. We quote:

	Bid.	Asked.
U. S. Currency 6s	115½	115¾
U. S. 6s, 1881, reg	117⅝	117⅞
U. S. 6s, 1881, c	118¾	119
U. S. 6s, 5-20 reg. May and Nov	114¾	115
U. S. 6s, 1862, c	114¾	115
U. S. 5-20 1864, c	114¾	115
U. S. 5-20 1865, c	115¼	115½
U. S. 5-20 1867, r. Jan. and July	114⅜	114⅝
U. S. 5-20 1865, c. Jan. and July	114⅜	114¾
U. S. 5-20 c. 1867 " "	116¼	116⅝
U. S. 5-20 c. 1868	116⅝	116⅞
U. S. 10-40 reg	111½	111¾
U. S. 10-40 c	114⅞	115⅛
U. S. 5s of 1881, reg	113	113⅛
U. S. " " c	113¾	113¾
Cen. Pacific Gold Bonds	103⅛	103¼

The following were the highest and lowest prices of stocks to-day:

	Highest.	Lowest.
N. Y. Cen. & Hudson Consolidated	105⅛	105
Lake Shore	95½	94⅞
Rock Island	113⅛	113⅛
Del., Lack. & Western	102⅛	102⅛
Wabash	73⅝	73½
Harlem	119	118¾
Western Union Telegraph	94	88⅝
Atlantic and Pacific preferred	36¾	36¾
Pacific Mail	72⅝	72½
Erie	67⅛	65¾
Ohio & Mississippi	48½	48¼
Boston, Hartford & Erie	9¼	8⅞
Union Pacific	36¼	35⅝
C. C. & I. C.	40¾	40⅝
Hannibal & St. Joseph	47¾	47⅜
" " preferred	70	70

GENERAL HARDWARE.

Our city stores are beginning to wear a look of business, and merchants report a good deal of activity already, and promising indications for the future. The extraordinary telegram from London, which we print on the opposite page, has been the occasion of much remark. The price of coal controls to a great degree the price of all articles made of metal, and in this respect the advance reported is very important. 53 shillings per ton is equal to nearly $13, gold—more than twice the currency price in this city for a much better coal. The present price of coal in England is also important, as an evidence of the length to which trades' unions have carried matters in that country. It is impossible to see how English manufacturers can prosper, or even compete successfully with their foreign rivals, until the power of the trades' unions is broken; and from present appearances it would seem that this can only be done by a wide-spread and severe financial and commercial revulsion, which would leave labor prostrate and helpless. For the present, these high prices for coal mean dearer Iron and Hardware in England and some advantage thereby to our American manufacturers.

We print below a circular which is sent us by a firm in Indiana, who ask our opinion of it. Our correspondents say: "We looked for a decline in Stoves, to correspond with the decline in price of Iron, and we cannot help believing that the prospective farther advance in Stoves is for speculative causes only, and not for the cause as given in the circular."

The following is the circular referred to:

CINCINNATI, January 25, 1873.

To the Stove Trade: From the tone of numerous letters that have been received from different sections of the country, by the Stove founders of Cincinnati, we are convinced that an erroneous opinion exists in the minds of many dealers in regard to the present cost of Stoves, and the price of pig iron, of which they are made, as compared with last year. The object of this circular is to give the trade as nearly as possible a correct idea of the present condition and future prospects of the Stove and pig iron markets.

It may not be generally known by those engaged in the business of selling Stoves, that in the manufacture of this article a soft, fluid iron is needed, and that but little other than No. 1 Charcoal Pig Irons have thus far been used by the Cincinnati stove founders.

Of this character of iron the supply during the past year has not been equal to the demand, and there are no facts at present indicating that during the present year this supply will to any great extent be increased. It is a recognized fact, that of the stone coal furnaces west and south, but few have been able to produce even a reasonable supply of desirable Stove irons. The result has been that while there has been during the past three months a large and increasing stock of forge irons suitable for mill purposes, the quantity suitable for the manufacture of Stoves has not been commensurate with the wants of the trade.

In this connection it is proper to state, with regard to the market changes in prices of iron during the past four months, that while the grades used for mill purposes have declined from eight to ten dollars per ton, Stove irons have declined not over three to four dollars from the highest point attained. With regard to the prospect of prices of pig iron for the year 1873, it may be stated that by the advance already established in prices of Missouri, Lake Superior, and Lake Champlain ores, it is conceded that the average increased cost of production of pig iron this year over last will be at least $7 to $8 per ton.

In estimating the position of the Stove manufacturers for the year to come, as compared with last year, it should not be forgotten that during the year 1872 our manufacturers, anticipating higher prices, laid in unusually large stocks early in the season, thus enabling them to offer their product to the trade without demanding the excessive advance which would otherwise have been a necessity, and the benefit of their foresight was thus fairly divided with their customers.

Statistics of the prices paid by the Stove manufacturers of this city, for the year 1872, show that the average cost of iron to them did not exceed $47 per ton. In view of the facts indicated above, the prevailing conviction of those engaged in the iron trade cannot fix the price for the coming six months at less than $50 to $53 per ton, or $3 to $6 per ton higher than the prices paid by the Stove manufacturers last year.

Starting out upon the present season without a supply on hand, and compelled to pay prevailing rates for the raw material, we trust our friends will recognize the justice of our statement that *higher*, rather than *lower*, prices for Stoves should be expected.

With our thanks for the liberal patronage of the past, we invite the attention of the trade to this market, assuring them that the same liberal policy which has heretofore been pursued, with regard to terms and prices, will characterize our course in the future.

WM. RESOR & CO.
CHAMBERLAIN & CO.
GREENWOOD STOVE CO.
REDWAY & BURTON,
MEARS, OLHABER & CO.
POMEROY, PECKOVER & CO.
GALWAY, SEMPLE & CO.
YOURTEE HOLLISTER & CO.
I. DROEGE & CO.

With regard to the condition and prospect of the iron market, present and future, we fully concur in the views expressed in this circular.

TRABER & AUBERY,
Commission Merchants for the sale of Pig Iron, No. 5 and 7 Public Landing.

WILLIAM MEANS,
Pig Iron and Coal, Bar and Boiler Plate Irons, and Iron Ores, 122 Walnut Street, Cincinnati.

ADDY, HULL & CO.
Pig Iron and Iron Ores, corner Vine and Water Streets, Cincinnati, O.

THOS. G. SMITH,
Dealer in Hot and Cold Blast Pig Iron, 53 West Second Street, Cincinnati, Ohio.

We think that in every statement of fact this circular is entirely correct. The manufacturers of Stoves are compelled to use the most expensive varieties of pig iron, and economy in this matter has always resulted unfortunately. Our Eastern makers last year tried some experiments with irons not strictly first class, which satisfied them of the impossibility of profitably using any but the best. It is true, with regard both to the Eastern and Western iron markets, that Foundry Irons—especially No. 1—declined less than Mill Irons, and have lately advanced more. No. 1 Foundry Iron is now selling in this market at a considerably higher price than the bulk of iron sold last spring for; and our prices from Cincinnati, on the opposite page, will show that rates there are much higher than $47 a ton, which is by the circular said to be the average price paid by the Stove manufacturers of that city last year. As to the prediction of prices for the coming six months, we can only say that, in our opinion, any manufacturer would be very foolish who based his calculations on lower prices than those named. Last year a great many Stoves were sold which were made of cheap iron; but that will not be the case this year.

Russell & Erwin Mfg Co. have taken the sole agency for the Round and Flat Head Silver and Brass Capped Screws made by the American Ring Co. They also announce that the National Screw Co., for which they are sole agents, has largely increased its production, and is now prepared to execute orders promptly for Round and Flat Head Machine Screws, at the usual prices. Russell & Erwin also issue their January discount sheet, which is as follows, so far as their own goods are concerned:

Page. Dis. %
1 to 109 Door Locks and Latches (Blue List of June 8th, 1872) 25
110 & 111 Real Bronze St. Door Handles and Latch. 25
Make list as follows:
No. 705 Real Bronze S. D. Handle & Lift Latch, per doz ..... $36·00
706 Real Bronze Single Handle with Latch, 47¼, per set ..... 3·50
Real Bronze Single Handle with Latch, 47½, per set ..... 3·50
Real Bronze Single Handle with Latch, 47¾, per set ..... 3·75
Real Bronze Single Handle with Latch, 7·7·, per set ..... 4·25
707 Real Bronze Double Handle with Latch, 47¼, per set 5.50
Real Bronze Double Handle with Latch, 47½, per set ..... 5·50
Real Bronze Double Handle with Latch, 47¾, per set ..... 5·75
Real Bronze Double Handle with Latch, 747½, per set ..... 6·25
112 & 183 Door Locks, Latches, Knobs, etc., (see blue list of June 8, 1872) 25
Add new classes of keys as follows:
155 & 156 Class 49, Brass Keys for Locks 801, 871, per doz. $1·38.
Class 160, Malleable Iron Keys, Tinned, for Locks 072, 340, 342, 350, 352, per doz. 0·50
Class 161, for Locks, 800, 870, per doz. ... 0·50
" 162, for Locks 615½, per doz ..... 0·50
184 Russell's Sheaves 15
185 " and Rail 15
Add Russell's No. 10 Sheave Wheel ⅜ inch thick, for ordinary doors 15
3 4 5 inch.
$2·00 $3·00 $4·00 per set.
No. 15 is the Regular Sheave, ⅝ wheels.
" 17 " " " convex
186 Hatfield's Sheaves 20
186 Barn Door Rail 15
187 Hinges 20
188 Bells, etc. (Make List of Pure Bell Metal House Bells) 10
Rough, 70 cts., Polished, 80 cts.
190 Brooks' Patent Pull Bells 15
191 Brooks' Patent Crank Bells ..... net
For price of Bells with "Real Bronze" Fancy Cranks, add $1·00 per dozen to Prices with Plated Cranks. Make list of
No. 5 Plated Crank, $15·00
6 " " 15·00
1 Name Plate, 48·00
6 " " 45·00
192 Cupboard Catches, (change list as follows:) ... 10
No. 20 21 22 23 24 27 28
$8·00 9·00 11·00 12·50 13·50 12·50 14·00 ₩ gro.
193 Cupboard Catches and Turns (change list as follows:) 10
No. 0 1 2 15 16 17 18
$12·50 15·00 18·00 15·50 18·00 20·00 23·00 ₩ gro.
194 Cast Brass Latches (change list of No. 5 to $2 per doz.) 10
195 Cupboard Buttons (change list as follows) 10
No 2464 2465 2466
$7·00 7·75 9·00 per gro.
Japanned Iron Raised.
1¼ 1½ 2¼ inch.
$0·45 0·50 1·10 per gro.
Japanned Iron, on Plates.
1½ 1¾ 2 inch.
$1·75 2·00 2·25 per gro.
196 & 197 Shutter Bars and Sash Fasteners (change list of "New York Pattern.") 10
1¾ 2 2½ 3 inch.
Brass ..... $1·15 1·30 1·50 1·75 ₩ doz.
Electro Plate. 3·00 3·25 3·50 3·75 "
198 Sash Locks and Sash Lifts (change list of Sash Lifts) 10
No. 1 61 81 with screws.
$2·00 24·00 18·00 per gro.
199 Sash Fasteners, Centers and Rollers 10
200 Trunk Rollers, Window Springs, Sash Cord Irons (change list of Window Springs) 10
No. 2 12
$10·00 3·00 per gro.
201 Pulleys (change list) 10
No. 1 2 3 4 10 20 21
$0·36 0·38 0·52 0·61 0·54 3·60 4·25
Add No. 22, 2¼ Brass Face and Wheel, $8·00
" 23, 2¼ " Iron " 5·50
202 Pulleys 10
203 Store Door Shutter Trimmings, change list as follows 10
Shutter Lifts, Flush, $2·25; 3 hole, $1·50.
Stubs and Plates, Square, $2; Round, $2·25.
208 Pulleys, change list as follows 10
Jap'd Screw Pulleys..1¼ 1½ 2 2½ 3 inch.
$0·34 ·41 ·55 1·25 1·50
Jap'd Side Pulleys ..... 1¼ 1½ 2 2½ inch.
$0·55 ·68 ·83 1·50
Brass Screw.. ¾ ⅞ 1 1¼ 1¾ 2 inch.
$1·00 1·10 1·30 1·60 4·50 5·50
206 Flush Rings and Ferrules, change list 10
Brass Flush Rings ..... 1 1¼ inch.
$1·00 1·20
207 Handles, change list 10
Japanned Chest Handles ... No. 11 12 13
$1·50 2·50 3·50
208 Drawer Pulls, change list 10
No. 500 510 512 513 520
$3·25 2·50 4·50 4·50 3·25
209 Store Door Handles 10
210 Mortise Bolts (change list of 3½ in Brass Porcelain Knobs, $4·25) 10
211 Brass Chain and Flush Bolts 10
Change list of 2 inch Chain Bolts to $5·00.
Change list of Flush Bolts,
¾x2 2½ 3 3½ 4 inch.
$0·45 0·50 0·60 0·70 0·80
212 Brass Flush Bolts (change list as follows) 10
½x2½ 3 4 5 6 inch.
$0·60 0·70 0·90 1·10 1·30
¾x4 5 6 7 8 inch.
$1·00 1·80 2·10 2·50 3·00
9 10 12 15 18 inch.
$3·50 4·00 4·75 6·00 7·00
213 Brass Flush Bolts (change list as follows) 10
1¼x1¼ 2x1½ ¾x2 3 1x8 inch.
$1·75 2·00 1·50 1·75 4·50
10 12 18 24 inch.
$5·50 6·50 10·00 12·60
1¼x8 10 12 18 20 24 inch.
$9·00 10·20 11·50 18·00 20·00 25·00
214 Brass Ship Bolts 10
Change list of Flat Bolts .... 2¼ 3 inch.
$1·65 2·20
215 Brass Ship Bolts 10
Change list .... 2½ 3 4 5 6 inch.
H'vy Sq're Bolts. $3·00 4·00 5·00 6·00
Light " $2·25 2·50 3·50
Heavy Neck Bolts 3·75 4·75 6·00 7·00
Light " 4·00
216 Brass Ship Bolts 10
Change list ..... 3 4 6 inch.
Barrel Bolts ..... $3·75 5·00 7·00
217 Brass Bolts, change list as follows 10
No. 1 2 3 4 5 6 7
No. 21 22 23 24 25 26 27
$2·75 3·00 3·50 4·40 4·25 4·50 5·00
No. 11 12 13 14 15 16 17
No. 31 32 33 34 35 36 37
$2·50 2·75 3·00 3·50 3·75 4·00 4·50
Cupboard Bolts ..... No. 50 60 51 61
$2·50 3·25 2·50 3·25
218 Chain Door Fasts 10
219 Plumb Bobs, Saw Screws, Ox Bails 10
Change list of Ox Balls ... No. 57 58 59
$5·25 6·00 7·00
221 Hooks, change list as follows ..... 10&10
Wardrobe Hooks.
No. 1 2 3 3½ 15 4 5 6 10 12
$0·45 ·55 ·65 1·00 1·00 1·00 1·25 1·60 1·00 1·60
Clothes Line Hooks ..... No. 1 1½ 2
$10·00 6·00 4·50
School House " ... No. 50 60
$3·50 4·50
223 to 226 Coat, Hat, and Harness Hooks (change list as follows) ..... 10 & 10
Coat and Hat Hooks.. No. 5 6 7 8 18
$2·00 2·25 3·25 2·40 2·00
Harness Hooks ..... No. 2
$10·75
227 to 229 Hooks 10
230 & 231 Box Chisels, Twine Boxes, &c 10
232 & 233 Polished Fire Irons and Standards (make list of pokers only) 15
No. 25 30 31 32 33 34 35 36
$2·50 3·00 4·75 4·75 5·00 5·00 7·50 7·50 ₩ doz.
234 Coal Tongs 20
Iron Shovels and Tongs ..... net
235 Brass Head Shovels and Tongs 5
236 Pokers ..... net
Poker and Lid Lifter 10
Waffle Irons 10
237 Ladder Sockets, &c 10
239 Waterman's Bake Pans (change list) ..... net
No. 10, $7·50, all others, $6·00.
240 & 241 Meat Cutters (change list) 10
No. 11 12 13
$27·00 33·00 42·00
242 to 247 Padlocks and Keys (change list as follows ..... 40 & 2
No. 2000 200 201 202 203 204
1 Key, $1·25 1·35 1·45 1·65 1·80 2·00
2 Keys, 1·50 1·60 1·70 1·90 2·95 2·35
No. 205 206 207 208 209 210 211
1 Key, $2·50 2·75 3·50 3·75 3·25 3·25 5·00
2 Keys, 2·92 3·33 4·08 4·33 3·83 3·83 5·92
No. 212 213 280 301 306 313 314
1 Key, $4·75 8·00 7·00 2·75 4·00 9·50 4·50
2 Keys, 5·33 8·92 7·92 3·00 4·58 10·42 5·08
Padlock Keys.
No. 2000, 200, 201, 202, 203, 301.. ₩ gross, $2·80
204 ..... " 4·25
205, 206, 306 ..... " 5·00
207, 208, 209, 210, 212, 314.. " 7·00
211, 213, 280, 313 ..... " 11·00
Assorted 2000 *a* 205 2000 *a* 207 2000 *a* 211 2000 *a* 280
$3·50 4·00 4·75 6·50
248 "American" Brass Padlocks (change list) .. 40 & 2
No. 1 2 3 4 5 No. 1, Plated
$2·25 2·25 3·75 4·25 5·50 4·00 ₩ doz
Circular and Switch Padlocks 10
250 Gate Pulleys, &c 10

The Norwalk Lock Co. have changed the numbers of their Locks, &c. The following shows the old and new numbers and present list prices, from which a discount of 25 per cent. is taken:

DOOR LOCKS AND LATCHES.

New Number.	Old Number.	Price ₩ doz.	New Number.	Old Number.	Price. ₩ doz.
1	0	$ 1·50	610	1140	19·00
5	0½	2·25	615	38	24·00
10	01	2·25	620	38½	40·00
15	01½	3·00	700	52	4·50
20	1	2·75	705	53	5·00
25	1½	3·50	710	54	3·00
30	2	1·75	715	55	3·50
35	2½	2·25	720	56	2·25
40	3	2·25	725	57	3·00
45	4	3·25	730	58	2·50
50	5	3·25	735	59	3·25
55	6	4·00	740	60	3·25
60	7	5·50	745	61	4·00
65	8	6·00	750	599	3·00
70	9	8·00	755	599½	3·50
75	9½	6·00	780	64	9·00
80	10	10·00	800	62	7·50
85	10½	6·00	805	62½	7·50
90	11	5·00	810	65	9·00
95	12	11·00	815	65½	11·50
100	12¼	13·50	820	262	10·00
105	12½	18·00	825	262½	10·00
105M	12½ A	19·50	830	263	21·50
105P	12½ D	24·25	835	263½	26·25
115	13	3·25	860	67	2·25
130	14	4·00	865	68	3·00
135	15	6·00	870	69	5·50
130	15½	4·50	875	70	2·25
135	16	18·00	880	71	3·00
140	17	25·00	885	80	3·00
145	18	2·25	890	81	3·75
150	19	2·75	895	82	5·00
155	20	2·75	900	074	3·50
160	21	4·50	905	075	4·25
165	21½	5·00	910	075¼	6·50
170	221½	10·00	915	075½	7·75
175	22	9·00	920	076	5·50
180	23	10·00	925	076¼	7·50
185	24	22·00	930	076½	8·75
190	25	30·00	935	98	7·50
195	26	40·00	940	98¼	5·50
200	27	7·50	945	99	9·00
210	41	20·00	950	083	4·25
215	41½	15·00	955	084	5·00
Brass		Per Set	960	085	6·50
220	041	13·00	965	086	5·75
Electro			970	087	6·50
220	041	16·00	975	088	8·50
Hand			980	294	15·00
220	041	30·00	985	295	16·50
Nickel			990	296	18·00
220	041	18·00	995	297	18·00
Brass			1000	297½	20·00
225	041½	13·50	1005	298	22·00
Electro			1015	089	11·50
225	041½	17·00	1020	090	14·00
Hand			1025	091	18·00
225	041½	32·50	1030	091½	20·00
Nickel			1035	092	22·25
225	041¾	20·00	1040	093	24·00
		Per Doz	1045	094	33·50
230	42	15·00	1050	096	10·50
235	42¾	24·00	1055	096¼	12·50
240	43	25·00	1060	290	21·00
245	43¾	40·00	1065	290¼	24·00
250	44	18·00	1070	291	27·00
255	44¾	11·00	1075	291½	30·00
260	45	11·00	1080	292	27·00
265	45¾	8·50	1085	292¼	30·00
270	46	50·00	1090	293	33·00
280	039	42·00	1095	293½	36·00
285	039¾	63·00	1110	00½	12·00
290	39	33·00	1115	00¾	13·50
295	39¾	30·00	1120	2012	18·00
300	39¾	38·00	1125	2013	21·00
305	40	55·00	1130	0103	27·00
310	40¾	65·00	1135	0104	32·00
315	40¾	32·50	1140	0105	42·00
320	40¾	40·00	1145	0100¾	13·50
325	47	80·00	1150	0100	15·50
330	47½	85·00	1155	0100½	17·75
335	48	47·00	1160	0101	21·00
340	48¾	50·00	1165	0102	33·00
345	49	40·00	1175	2011	21·00
350	049	50·00	1180	2 11½	24·00
355	049¾	73·00	1185	20113	27·00
360	339	25·00	1190	20 0	36·00
365	339¾	38·50	1195	2010	40·00
368	349¾	50·00	1220	133	9·00
375	99¾	3·00	1225	133½	3·50
375	99¾	5·50	1225 A	133½ A	5·00
380	99¾	6·50	1225 B	133½ B	6·00
385	099	4·50	1225 C	133½ C	6·50
385	099¾	7·00	1225 D	133½ D	7·00
390	099¾	8·00	1230	133¾	4 50
410	3000	3·75	1230 A	133¾ A	6·00
415	3010	4·50	1230 B	133¾ B	7·00
420	3020	5·75	1230 C	133¾ C	7·50
425	3030	6·25	1230 D	133¾ D	8·00
430	3040	7·75	1240	400	4·00
450	800	4·75	1245	401	5·00
455	810	5·50	1250	410	4·75
460	820	6·75	1255	411	6·00
465	830	7·25	1260	420	6·25
470	840	9·00	1265	421	7·50
475	1000	5·50	1275	0500	3·50
480	1010	6·50	1280	0501	4·50
485	1020	7·25	1285	0510	4·50
490	1030	8·25	1290	0511	5·50
495	1040	10·00	1300	500	4·25
500	1040½	11·50	1305	501	5·25
	Fancy		1310	510	5·25
505	1040½	24·00	1315	511	6·25
515	1041	13·00	1320	520	6·50
525	1042	14·00	1325	521	8·00
530	1043	16·00	1330	530	5·75
535	1050	6·00	1335	531	6·50
540	1060	7·00	1340	540	6·50
545	1070	8·50	1345	541	7·50
555	1080	10·00	1350	550	8·00
560	1090	11·50	1355	551	9·25
565	1090¾	15·50	1360	553	14·00
570	1100	13·50	1365	555	16·00
575	1100¾	17·50	1375	560	9·00
580	1105	15·00	1380	565	10·00
585	1105¾	19·00	1385	570	12·00
590	1110	17·00	1390	575	10·00
595	1110¾	21·00	1395	580	11·00
600	1120	11·00	1400	585	13·50
605	1130	14·00	1405	590	16·50
1410	595	22·00	1570	636	12·50
1415	598	25·00	1575	637	15·00
1430	1233½	10·50	1580	640	10·00
1435	123	12·00	1585	645	8·50
1440	124½	13·00	1590	655	11·25
1445	124	14·50	1595	650	9·50
1450	125	13·00	1600	660	14·00
1455	126	15·50	1605	665	17·00
1475	0120	22·50	1630	680	23·00
1480	0130	24·00	1635	685	28·00
1485	0131	33·00	1640	690	33·00
1490	229	30·00	1645	690½	28·00
1495	230	36·00	1650	690¾	30·00
1500	231	48·00	1655	691	33·00
1520	600	6·50	1660	692	36·00
1525	605	7·50	1665	706	34·00
1530	610	9·00	1670	707	38·00
1535	615	7·25	1675	708	41·00
1540	620	8·25	1680	709	44·00
1545	625	10·00	1685	695	29·00
1550	626	11·25	1690	700	33·00
1555	627	13·00	1695	705	39·00
1560	630	7·25	0160	160	6·50
1565	635	8·25			

No. 1700.

PATENT HOTEL MORTISE LOCKS.

Size 3¼x5 in.

Heavy upright Brass Front and Bolts, all Wrought Iron inside work, Brass Pipe or Drill Pin Keys; 300 Changes.

Price ₩ doz., $30·00.

This Lock is provided with two bolts, the key operating the main bolt (which has four tumblers) will also operate the independent bolt on the inside, which, when locked, cannot be picked from the outside, neither can the main bolt be locked or unlocked from the outside, even with the master key. The master key operating on an Independent set of tumblers, is so constructed as to pass all the 300 changes of tumblers on the main bolt, and will also operate on the inside bolt.

ESCUTCHEONS.

New Number.	Old Number.	Price ₩ doz.	New Number.	Old Number.	Price ₩ doz.
1	571½	$ 3·00	345	590	1·00
3	...	4·50	355	510	75
5	535½	1·10	360	515	75
10	540½	1·10	365	520	75
15	545½	1·15	370	530	75
20	570½	3·25	380	534	1·10
30	630½	3·00	385	535	1·10
35	635½	4·25	390	540	1·10
40	640½	4·50	395	545	1·15
45	663½	7·50	400	570	2·25
50	665½	7·50	420	615	1·00
60	577½	5·00	425	610	1·50
65	536½	3·00	430	605	1·00
70	541½	3·00	435	600	1·00
75	546½	5·50	440	602	1·50
80	641	16·00	445	595	1·00
90	626½	8·00	460	645	5·00
95	636½	10·00	465	648	5·00
100	641½	16·00	470	650	5·00
105	662½	20·00	480	655	7·50
110	675½	20·00	485	660	20·00
120	515½	75	490	665	7·50
125	520½	75	495	670	20·00
130	530½	75

IRON.

American Pig.—The general features of the American Pig Iron market are unchanged. Holders are very firm in their asking prices, but buyers of large lots can not be found, and the regular season's demand for contracts can not be said to have commenced. The larger city consumers are only working on one-half and three-quarter time, more especially those who make iron for building purposes, so that the consumption here has been very light. Most dealers appear to be still under the impression that the market is in a favorable position, and that the chances are more probable for a higher range of values than otherwise in the near future, although there are still some who prophesy that present prices will have to be reduced before the bulk of the production is placed. There are rumours of some considerable sales of Hudson River Forge Iron on a basis of $40 @ $42, but we were unable to obtain any particulars. We quote: No. 1 Lehigh brands at $48 @ $50; No. 2, extra, $47 @ $49, and Forge Iron, $40 @ $42.

Scotch Pig.—The cable advices of yesterday report a further advance in the price of coal, which yesterday sold at 48s. per ton, and during the day advanced to 53s. Many furnaces and mills have been compelled to suspend work, and the advance has served to flatten the market for English railway securities. The continual strikes among the colliers and miners, together with the rapid advance in the price of coal, all have the effect of helping to sustain the price of what little Scotch Pig is here. The price now is so high that the consumption is reduced to the lowest possible limits, and, as remarked in the paragraph above, many of the larger consumers have reduced their time. Scarcely anything is doing, and we only have to notice sales of 50 tons Eglinton at $55, and a sale of Carnbroe on private terms, but supposed to be at $56. Holders are asking $60 @ $62·50 for Coltness, $59 @ $60, for Gartsherrie, $57 for Glengarnock, and $55 for Eglinton.

Bar.—The market continues quiet, but prices firmly held.

Old Rails.—Little, if any, trade has transpired the past week in Old Rails, and prices are quoted nominally at $52 @ $53, gold, though it is doubtful if any quantity could be obtained at those figures.

Rails.—New English have been very quiet, and we do not hear of a single transaction since our last report. The nominal quotations are $72 @ $74, gold. American are also quiet but firm at $80, currency, from the mills in Pennsylvania.

Scrap.—The inquiry for Scrap Iron is limited, but the stocks are small and in few strong hands, who are holding at $57 @ $60 for No. 1 from yard, and very little offering at the inside price.

METALS.

Copper.—Early in the week the market for domestic Copper began to recover from the late depression, caused principally by more favorable cable advices, and prices have ruled strong all the week, with a fair general, though not active, demand. The sales foot up about 700,000 lbs. Lake at 34¼c. @ 34¾c. cash, and 35c. future delivery. The better cable advices mentioned above has materially strengthened English Copper, and lots for immediate delivery are held very strong, though offerings to arrive in 30 days are at a trifle reduction. Sales include 75 tons early, at 29½c. @ 30c., and 150 tons the latter part of the week at 30¼c. @ 30½c. for spot, and 30c. @ 30¼c. to arrive. Manufactured Copper and Yellow Metal continues steady at 43c. for New Sheathing; 45c. for Bolts and Braziers; 27c. for Bronze and Yellow Metal; and 32c. for Yellow Metal Bolts, net cash.

Tin.—Pig still continues in the dull apathetic condition that has characterized the market for some time past. Buyers do not appear to care about taking any more stock than just actually enough for immediate pressing requirements. The foreign markets are all higher than our own, which prevents any decided decline, while if an improved inquiry should set in, it is probable that higher figures would be established. We quote Straits at 30½c. @ 31c., English at 31c., and Banca at 36c., all gold values, but these figures, it must be remembered, are wholly nominal in absence of demand. The late activity in Tin Plates has subsided, and the market is rather dull and prices a trifle weak, notwithstanding the light supply here. We quote: I. C. Charcoal, $11; I. C. Coke, $9·87½ @ $10·00: Coke Terne, $8·75 @ $9·25; and Charcoal Terne, $10 @ $10·25.

Lead.—The market for foreign Pig Lead continues excessively dull, and prices are wholly nominal at 6¾c. @ 6½., gold, for ordinary. In domestic we notice sales of 50 tons at 6¼c., gold. Late mail advices from London give the imports for 1872 at 70,000 tons, against 65,000 in 1871, and 59,000 in 1870, showing a steady increase each year. The exports from London of Pig, Sheet, Pipe, &c., were 44,313 tons in 1872, against 44,787 in 1871, and 47,802 in 1870, indicating a falling off in the exports from previous years, but still Pig Lead has been scarce, and prices which ruled at £18 in October, had advanced to £22 in January. Manufactured Lead is quiet but steady at 9¼c. for Bar, 10½c. for Sheet and Pipe, and 16½c. for Tin Lined Pipe, less the usual discount to the trade.

Spelter and Zinc.—Foreign Spelter has met an improved inquiry, and the late advance is fully sustained, with the tendency toward still higher figures. Sales during the week will foot up about 100 tons Silesian at $7·15 @ $7·25, on the spot, and 275 tons, part to arrive, at $7 @ $7·25, all gold. Sheet Zinc continues quiet, but firm, at 10c. @ 10½c. from store, and 9c., gold, net, from agents' hands.

Antimony.—There is only a moderate trade in Regulus, and dealers generally ask 14½c., gold. We note a sale of 10 casks at 14¼c., gold.

The following is the review of the metal market specially prepared for *The Iron Age* by Messrs. Thos. J. Pope & Bro.:

Trade is becoming more active, and its prospects are considered very good for the coming season. Buyers are looking up goods, and manufacturers are beginning to receive their spring orders. Ice on the rivers and snow on the streets have for some time back prevented shipments, but the present thaw is rapidly opening the rivers and letting out freight by vessels.

Copper is firm, as regards Lake. In English, prices here are a trifle off, in consequence of some new arrivals. We quote, 30½c. to 31c.; Lake, 34½c.

Pig Iron is firmly held. Holders confidently look for further advances. The recent advance in England of coal, as cabled to the morning papers, to 53s., is equivalent to $12·46, gold. It must materially affect iron cost in England, and, indeed, has led to another advance there. We quote No. 1 extra, $50; No. 2 extra, $48 to $49; Gray Forge, $42 to $45. Scotch Irons are unaltered.

Lead.—Dull at 6¾c. to 6½c. for foreign.

Tin.—Quiet at 30½c. to 31c. Stocks large, and in Europe increasing.

Spelter.—Active at 7¼c. to 7½c., gold.

Antimony.—Quiet at 14½c., gold.

IMPORTATIONS.

Of Hardware, Iron, Steel and Metals into the Port of New York, for the week ending February 4, 1873:

Hardware.

Boker Hermann & Co.
Arms, cases, 18
Cardova S. de
Wire, bdls., 90
Cockayne J. W.
Cutlery, casks, 1
Files, casks, 1
Field A. & Co.
Casks, 1
Cases, 28
Chains, cks., 78
Packages, 4
Haine S. H.
Packages, 2
Harmar Wm. & Co.
Mdse. pkgs., 7
Lau & Garlichs,
Arms, cases, 28
Mdse pkgs., 2
McEntee W. C.
Cases, 2
Schuyler, Hartley & Graham,
Mdse. pkgs., 1
Sawyer John,
Wire rope, coils, 2
Schoverling & Daly,
Mdse. pkgs., 6
Tillotson L. G. & Co.
Wire, lots, 125
Western Union Tel. Co.
Wire, lots, 184
Wiebusch F.
Anvils, 150
Chains, casks, 54

Iron.

Congreve Chas. & Son,
Rails, 1980
Cordova S. de
Scrap, bbls., 8; pcs., 40
Holdane J. H. & Co.
Flues, 640
Henderson Bros.
Pig, tons, 375
Milliken S. Jr.
Rods, bdls., 147
Morris L. W.
Bundles, 272
Nightingale & Kilton,
Bars, 34; bdls., 17
Smith G. G. & Co.
Bars, 954
Tyler & Gilson,
Scrap, tons, 25
Waydell & Co.
Scrap, tons, 37
Whitney C. W.
Flues, 235
Order.
Pig, tons, 280

Steel.

Cooke, McCullough & Co.
Rails, 584
Hogan John,
Cases, 15
Bundles, 72
Naylor & Co.
Cases, 4
Tires, 27
Wardlow W. C.
Bundles, 29
Cases, 5
Order.
Bundles, 827
Spring, kilos, 10,500

Metals.

Britton, Holbrook & Co.
Brass goods, cases, 7
Burling & Davis,
Scrap copper, pkgs., 62
Baring Bros. & Co.
Tin slabs, 2251
Lead, pigs, 760
Claude C.
Leaf tin, cases, 1
Cordova S. de
Copper, pcs, 81; bbls, 2; bxs., 1
Yellow metal, bbls 1,
Brass metal, bbls., 2
Lead, bdls, 16
Naylor & Co.
Tin plates, bxs. 273
Phelps, Dodge & Co.
Tin plates, bxs., 1207
Tin, bbls, 25
Tin ingots, 350
Waydell & Co.
Scrap copper, hhds., 7; tierces, 1; bbls., 1; pcs., 1
Order.
Scrap, copper, pkgs., 78
Lead, pigs, 2139
Copper, ingots, 8917
Tin plates, bxs., 1500
Spelter, plates, 2506

PHILADELPHIA.

Messrs. Lloyd, Supplee & Walton, under date of February 4th, write us as follows: Trade remains without any great improvement over last week. Customers from the West report delays in sending orders for spring shipments, due to the severe winter, which will naturally cause a little later trade the coming spring. Local trade will doubtless be compelled to enter the market at an early date, and even at this date light mail orders are being received. The trade has been somewhat demoralized during the last week, owing to the difficulty between the Rowland's, manufacturers of the different Rowland's Shovels. We do not know how long this state of affairs will exist. We now offer them at discount, 20 per cent., which, we are informed, is less than the cost of production, taking the present cost of iron and steel as the basis. At this price there is no profit to the jobber, but, being compelled to meet manufacturer's prices, we hold at that figure for the present. Orders are only accepted so far as stock will enable us to fill them, as the manufacturers will not guarantee prices to hold any length of time. The Rule market has been somewhat demoralized, and Rules are now offered by jobbers at discount 50 per cent., and in some cases sales have been made at 50 and 10 per cent. discount. Of course we cannot tell how long this will remain open, as the makers are in an open fight. Eastern Carriage Bolts are held more firm, and are now offered at discount 60 to 60 and 5 per cent. There are no important changes to note in Shelf Hardware. Prices remain firm as before quoted.

PITTSBURGH.

Pittsburgh, Feb. 1, 1873.—Business has been very dull during the past week, owing mainly to the extreme cold weather. As might be expected, people made business a secondary consideration while the thermometer was ranging from zero down to 20° below. This has been one of the severest winters we have had for many years, and navigation is closed now for the fourth time. There was a coal-boat stage of water about two weeks ago, but little or no coal got out in consequence of the heavy ice; and while the weather has moderated a little, the prospects are not very bright at this writing for an early resumption of navigation. And, furthermore, while navigation is closed, general business, particularly in manufactured goods, will be restricted, as good rivers are very essential for the spring trade. Large shipments of wagons, wheel-barrows, plows, glass, steel, iron and nails are made South and West every spring by steamers, in consequence of the cost of transportation being cheaper; hence, no material or permanent improvement in general trade is anticipated until navigation has been resumed. The iron trade, like all other branches, has been affected considerably by the stinging cold weather, though business continues moderately active nevertheless, and operators generally are calculating upon a good spring and summer trade. Pig iron is not moving as rapidly as could be desired, in consequence of the hitch between buyers and sellers, referred to in my last letter. Producers in the Mahoning and Shenango Valleys, upon whom we are dependent mainly for supplies, in view of the fact that there is no probability of any reduction in the cost of ore, are holding good irons at an advance of from $3 to $5 per ton; while consumers, on the other hand, claim that there is nothing apparent in the market for finished irons, either present or prospective, to justify them in paying the prices demanded; hence, this being the situation, business is comparative light, but, as already intimated, it is all that can be expected under the circumstances. The operations are mainly in the common and medium grades, which can still be obtained, as buyers generally are unwilling to pay the prices at which standard brands are held, hoping that the market may turn in their favor. While this is possible, it is not probable, as the indications at this writing point in the contrary direction. Choice Open Gray Red Short Irons are held at from $43 to $45, 4 months, with but few buyers at present above $40, 4 months; Mottled and White, $37 to $38, 4 months; No. 1 Foundry, sold mostly in small lots at from $48 to $51·50, the latter for a choice lot, 6 months; No. 2 may be quoted at $43 to $45, 4 months. If sellers were satisfied to accept the prices prevailing just prior to the close of last month, there could be a very large amount of pig sold, as consumers have light stocks, and they are nearly all anxious to buy. Trade in finished irons, although not active, is increasing, and as manufacturers generally are unwilling to sell largely at card rates, claiming that manufactured goods are cheaper relatively than the raw material, the market is strengthening, and an early advance is not improbable. An active spring and summer trade is anticipated in view of the fact that stocks in the hands of jobbers are unusually light, and we can see nothing in the position of the market to induce jobbers to hold back, as it is almost certain that prices will be no lower, while, on the other hand, there is a probability, as already intimated, of an advance. There is a continued steady demand for steel, and while orders are not coming in as freely as they did in November and December, trade is fully as good, if not better, than it usually is at this particular time, and prices are firmer, though unchanged. The window glass trade continues dull, but an improvement is confidently expected this month, and the indications generally are regarded as being favorable for a good spring and summer business. No change to note in card rates; discount for round lots, 50 and 5 per cent.

LOUISVILLE.

Mr. Geo. H. Hull, under date of Feb. 3, writes us as follows: Forged Irons have been in good demand throughout the week, at full figures. Foundry is quiet, but firm. The stock of Cold Blast is light, and arrivals are principally taken up on old contracts. The usual time, four months, is allowed on quotations below:

HOT BLAST CHARCOAL.

No. 1 F'dry, from Hanging Rock Ores			$56·00 @ 57·00
" 2 " " " "			53·00 @
" 1 Forge, " " "			45·00 @
" 1 F'dry, from Tennessee Ores			55·00 @
" 2 " " "			52·00 @
" 1 Forge, " "			45·00 @
" 1 F'dry, from Alabama Ores			57·00 @
" 1 " " Iron Mountain Ores			59·00 @

HOT BLAST STONE COAL.

No. 1 F'dry, from Missouri Ores			55·00 @
" 2 " " " "			52·00 @ 5
" 1 Forge, " " "			44·00 @ 4

COLD BLAST CHARCOAL.

Car Wheel from Hanging Rock Ores		60·00 @ 65·00
" " Tennessee Ores		59·00 @ 60·00
" " Alabama Ores		60·00 @ 62·00
" " Georgia Ores		60·00 @ 62·00
" " Missouri Ores		58·00 @ 60·00
" " Kentucky		58·00 @ 60·00

CINCINNATI.

Messrs. Addy, Hull & Co., under date of Feb. 1, write us as follows: The market is gradually assuming a firmer tone. It has been, however, unsettled and irregular during the week. Sales of round lots of Foundry have been made at concessions from current quotations. Foundry Irons of standard brands are difficult to obtain. Forge Irons have not yet developed much activity, though there is more inquiry. Car Wheel Irons are still in light supply, with a good demand. Quotations unchanged.

HOT BLAST CHARCOAL.

Hanging Rock No. 1	₱ ton	$55·00 @	—4 mos.
" " No. 2		53·00 @ 54·00	—4 mos.
" " Forge		45·00 @	—4 mos.
Tennessee No. 1		54·00 @	—4 mos.
" Forge		44·00 @ 45·00	—4 mos.
Alabama No. 1		55·00 @ 56·00	—4 mos.
Missouri No. 1		56·00 @ 59·00	—4 mos.
" " No. 2		54·00 @ 57 00	—4 mos.

HOT BLAST STONE COAL.

Missouri No. 1	₱ ton	$55·00 @	—4 mos.
" Forge		44·00 @ 45·00	—4 mos.
Ohio No. 1		54·00 @ 55·00	—4 mos.
" Forge		41·00 @	—4 mos.
Scotch Pig, No. 1		54·00 @ 55·00	—4 mos.

COLD BLAST CHARCOAL.

Hanging Rock Car Wheel	₱ ton	$60·00 @ 65·00	—4 mos.
Missouri " "		60·00 @ 62·00	—4 mos.
Kentucky " "		60·00 @	—4 mos.
Tennessee " "		60·00 @	—4 mos.
Georgia " "		60·00 @ 62·00	—4 mos.
Alabama " "		60·00 @ 62·00	—4 mos.
Machinery and Forge		58·00 @ 60·00	—4 mos.
Blooms		112·00 @ 116·00	—4 mos.

BALTIMORE.

Messrs. Wyeth & Brother, Iron and Steel merchants, corner of South Charles and Lombard streets, report us the following prices, under date of Feb. 4, 1873: Trade has ruled fair for the past week, and quotation figures, as a general thing, adhered to, though some shading has been done to induce desirable orders. Horse Shoes have declined with the beginning of the month 75c. per keg, and we now quote them $6·12½ per keg.

AMERICAN REFINED BAR IRON.

1 to 6 wide by ⅜ to 1 thick	4¼c. to 4¾c. per lb.
1 to 4½ wide by 1½ to 2 thick	
Round and square, ordinary sizes, from ⅝ to 2 inclusive	4½c. to 4¾c. "
Hoop Iron, 1½ wide and upward	5¾ to 6 c. per lb.
Band Iron, from 1¼ to 4 in. wide	5 to 5½c. "
Horse Shoe Iron ⅜ to 1 wide by ⅜ to ½ thick	5½ to 5¾c. "
Norway Nail Rods	7¾c. to 8c. "
Black Diamond Cast Steel, Flats, Squares and Octagon, ordinary sizes	17c. "
Machinery Steel	12c. "
Cast Spring Steel	11c. "
Homogeneous Steel Plate	13c. "
Perkins' Horse Shoes, per keg of 100 lbs.	$6·12½
" Mule Shoes " "	7·12½

Common Horse Nails, from 14c. to 18c. per pound.

10	9	8	7	6
23	24	25	26	28c. per lb.

Putnam Horse Nails.

R. R. Spikes.....5¾ by 9-16 at 5¼c per lb.

BOSTON.

Feb. 1.—There is no marked change in the Iron market since our last report. Refined Bar is in moderate request, and prices are very firm, but without material change for the past week. Some sales of ordinary sizes have been made as low as $100, which will not cover the cost of laying down Iron bought at present prices, either in England or Pennsylvania, but some houses, which have bought below present rates, are able to sell at the figure we name. The ruling price, however, is higher, and the ordinary selling rates are within the range of our quotations. The most recent advices from England indicate a very strong feeling among manufacturers there. The labor question seems to be the absorbing one among Iron dealers. At the Birmingham "Quarter Day" meeting £12 was fixed upon as the price for Refined Bar Iron, but no first-class stock can be bought at that rate, the best makers holding their stock at £13 to £13. 10/. The prevailing feeling at the meeting to which we have referred seemed to be that to advance the "List Rate" above £12 would work injuriously, and prevent trade from being active. They also feared the effect of a great advance upon their employes, who would be encouraged to strike if they knew their employers were getting extreme prices. Pig Iron is in limited demand, foundrymen being undecided as to the policy of buying at present. American remains about as last quoted, but Eglinton is firmer, and is selling $3 per ton higher than it was three weeks since. Coltness and Gartsherrie are unchanged in price. We quote yard lots of American at $55 to $58 per ton, including No. 2 extra at $53, and No. 1 at $55. Scotch is held firmly. We quote Eglinton at $55, Coltness at $58 to $59, Gartsherrie at $58 to $59. American and English Bar are selling fairly at $105 to $117·50 per ton for the ordinary sizes, and $125 to $150 for extra sizes, according to size. Cast Steel is selling at 16c. for English, gold, 18½c. currency, and 16c. to 18c. for American, currency, with fancy brands of English selling at 17c., gold. Anchors are selling at 8½c. per lb.; Chain Cables (⅝ to 2 inches thick), 7c. to 8¾c. per lb.; Coil Chains, 7½c. to 16c. from 3-16 to 1¼ inches. Boiler Plates remain steady. We quote at 8c. for Flanges, 6c. for C No. 1, and 5¾c. per pound for Common and Tank. Russia Sheet is steady at 18c. to 19c., gold, and 22c., currency, for perfect lots. English and American do. is very firm, and selling at 7½c. to 9c. per lb., currency. Galvanized Sheet Iron remains steady and active at unchanged prices. We quote No. 20 at 12c.; Nos. 21 to 24, 13c.; 25 and 26, 14c.; 27, 15c.; 28, 16c. Nails are in fair demand, with sales at $5 for 10d. to 60d., and other sizes at a range of $5·25 to $7·25 per 100 pounds.—*Com. Bulletin.*

ST. LOUIS.

Messrs. Semple, Birge & Co., under date of Feb. 1st, write to us as follows: This morning we sent you corrected market report for the next issue of your paper. Since that time a telegraph dispatch has changed prices of Horse Shoes to the following:

HORSE SHOES.

Rhode Island (Perkins' pattern)	per keg,	$6·75
Burden's	"	6·75
Mule Shoes	"	$1·00 extra
Rhode Island Trotting Shoes	"	2·50 "

CLEVELAND.

Messrs. Cleveland, Brown & Co., under date of Jan. 27, write us as follows: Please no[te] in card rates of Iron. There h[as] line, but we quote as we do to [ca]rds, instead of card rates, as [ma]nd is good and prospects [for] season's trade. We hand [fol]lowing as our market prices:

[3-]10 rates.
[$5]·35 rates.
[SHEET, $6·70] for No. 24, other numbers in [pro]portion.
[GALVANIZED, 20] to 25 per cent. off list.

Messrs. Reddington & Adams, under date of [Jan. 27,] write us as follows: The Iron market with us is fairly active, and has a strong upward tendency. Producers are not disposed to sell, except in small lots, at ruling rates, anticipating an early advance. Prime Open Gray Red Short is scarce, and strong Foundry Irons difficult to obtain. The market is entirely bare of charcoal metal. Indeed, it is being freighted, all rail, from Escanaba to supply some pressing wants. American Black-band Irons are well sold up, and many of the furnaces are sold ahead for 60 days. Scotch is firm at quotations, with but a few hundred tons for sale. Ores are scarce for immediate delivery; in fact, there is no stock on hand unsold. The price for No. 1 Lake Superior Red Specular, for spring delivery, has been fixed by the leading companies at $12, delivered afloat in Cleveland. We quote as follows:

LAKE SUPERIOR CHARCOAL IRON FOR MALLEABLE AND CAR WHEEL USE.

No. 1, on cars here		$60·50—4 m.
No. 2,	"	60·50—4 m.
No. 3,	"	60·50—4 m.
No. 4,	"	64·50—4 m.
No. 5,	"	65·50—4 m.

BITUMINOUS IRONS FROM LAKE SUPERIOR ORE.

Prime No. 1 Foundry		$51·50
" No. 2	"	52·50
" No. 1 Forge		$43·50 @ 45·00

AMERICAN BLACK-BAND IRON, SMELTED WITH BITUMINOUS COAL.

No. 1, on cars here		$54·00—4 m.
No. B-1,	"	52·00—4 m.
No. 2,	"	51·00—4 m.

H. B. HANGING ROCK CHARCOAL.

No. 1, on cars here		$60·50—4 m.
No. 2,	"	58·50—4 m.

C. B. TENNESSEE CHARCOAL.

No. 1, on cars here	$62·50—4 m.

C. B. RED RIVER (Kentucky).

No. 3, on cars here		$62·50—4 m.
No. 4,	"	64·50—4 m.
No. 5	"	65·50—4 m.

H. B. MISSOURI CHARCOAL.

No. 1, on cars here		$62·50—4 m.
No. 2,	"	61·50—4 m.

SCOTCH AND ENGLISH IRONS.

No. 1 Glengarnock	$60·50
No. 1 Eglinton	58·50
No. 1 Ayresome	58·50
No. 1 Sinthropie	58·50

Advance in Coal in the English Markets —Chinese Workmen for Wales.

(By Telegraph.)

London, Feb. 4th.—There has been another rise in the price of coal, which this morning sold at 48s. per ton, and during the day advanced to 53s. Many furnaces and mills have been compelled to suspend work, and the advance has served to flatten the market for English railway securities.

The proprietors of several colleries in the South of Wales, who have announced their intention to import Chinamen from California to take the place of the men now on a strike, have received anonymous letters threatening them with assassination should they carry out their design.

Latest Spanish Lead Report.

(Communicated to The Iron Age by Messrs. Zuricaldey & Arguimbau.)

Malaga, Jan. 11, 1873.—*Lead* has again risen, and it would be difficult to procure it to-day for less than 90 rials the quintal ($4·50 the 100 lbs. Spanish), free on board, there being a great demand for England, and we look forward to a further improvement.

Latest East India and Holland Tin Telegrams.

(Private dispatches communicated to The Iron Age.)

Singapore, Jan. 7, 1873.—*Tin* $35¼ the picul. Exchange 4 5⅝.

Penang, Jan. 9, 1873.—*Tin* $35 the picul. Exchange 4 5⅝.

Amsterdam, Feb. 1, 1873.—*Banca Tin* quoted 86 guilders. Opinion as to the future of this metal much divided.

Latest Chinese Nail Iron Telegram.

(J. W. Muller & Co.'s dispatch, via Ceylon.)

Shanghae, Jan. 8, 1873.—*Nail Iron* unaltered, 3·35 taels. Exchange, from 6/0¾, has declined to 5/11¾ for 6 months' Bank on London.

The Ceylon Plumbago Market.

(Clark, Spence & Co.'s Report, condensed for The Iron Age.)

Colombo, Dec. 12, 1873.—*Plumbago*—The demand for this metal is considerably in excess of the supply, and prices are rising. We quote Lump £26 to £27 per ton, Chip, £12 to £13, and Dust, £7 to £7 10. Exchange weaker. Discount for documents—Bank ½ per cent. premium; all 6 months' drafts on London.

The Hamburgh Metal Market.

(Translated for The Iron Age from the Borsenhalle.)

Hamburgh, Jan. 17, 1873.—For *Lead*, high prices are asked—German 23·00 marks, English 23·60 to 23·70, and Spanish of Rein & Co. 24. *Copper* is remarkably firm, with a moderate business for actual consumption. Drontheim and English best selected, 105; common Northern description, 97½ marks. *Tin* is taken for immediate requirements at firm prices, Banca at 1·62½, English at 1·55, and Rods at 1·57½. *Spelter* is remarkably firm. January shipment sold during the week to the extent of 2000 cwts., at 16 marks Banco.

Latest Chinese Metal and Coal Mail Account.

(Olyphant & Co.'s Circular, via San Francisco.)

Hong Kong, Dec. 11, 1872.—Metals.—*Nail Rod Iron* is somewhat wanted, and prices are well supported; *Bar* is lower. *Hoop Iron* is in demand for shipment to Japan. *Wire* is neglected. *Steel* is scarce and is saleable. *Tin Plates* are quoted down fifty cents per box. *Tin* has further declined, owing to increased receipts. *Lead* is held for better prices. *Quicksilver* remains as last quoted, but is not much wanted. *Metals.*—Iron, Nail-rod, $3·70 to $3·80; Square, Rd. & Ft. br., $3·55 to 4·25; Hoop, $4·75 to $5; Wire, $7·20 to $8 per picul. Steel, $4 to $4·50 per tub. Sales—840 piculs Nail rod, and 420 piculs Hoop. *Coals.*—Arrivals have been 1748 tons Cardiff, 1500 Australian, 900 Anthracite, per steamer from Singapore, and 300 of Keelung. The only reported sale has been of 600 tons Australian at $9·50 per ton ex. ship. English, $10·50 to $11; Cardiff, $11 to $11·50; Australian, $9 to $9·75; Anthracite, $10·50 to $11 per ton.

The British Iron-Clads.

The London *Times* is unhappy—and not without reason—because of the waste of so much money and labor upon iron-clad ships. We quote as follows from its editorial columns:

We had quite lately the Agincourt run on the Pearl Rock, and the Lord Clyde aground in the Mediterranean; and now the Bellerophon is "shaky about the bottom" from the collision with the Minotaur; the Sultan, from having touched the ground, it is supposed, at Ferrol; and the Northumberland, sister ship of the Agincourt, from "swinging on the Hercules' prow." Every one of these ships, except, perhaps, the Lord Clyde, cost from £350,000 to £500,000; and yet, from one cause or another, they are so handled that within a year or so they are all seriously endangered. To what are we to attribute this long category of disasters? Is it the fault of the officers, or of the ships, or of the Admiralty? Have our officers lost their ancient seamanship? Or are these ironclads unmanageable in company? Or are they only safe and manageable with an expenditure of coal which the rules or the practice of the Admiralty forbid or discourage? Some authorities will assign one cause and some another, but the country, we think, will not be satisfied at the condition of the navy which these misfortunes, as they are called, reveal. It seems but the other day that we heard of the Channel Squadron at Gibraltar, with picked crews and the newest armaments, the admiration and the envy of foreign officers. And now, out of six vessels, representing two and a half millions sterling, two are ordered home to repair the consequences of their own collision, and the two most powerful that remain are "shaky about the bottom" from running aground or from collisions with a consort ship. We advocated the other day a series of experiments afloat as the basis of new naval tactics to ascertain and measure the aggressive force of our ships against an imaginary enemy. It really seems as if it were a full occupation for our seamen to keep the ironclads afloat and prevent them from destroying one another. Where is the use, it will be said, of deciding how to fight the enemy when we do not know what we may have left at sea when the declaration of war is made? The building of these monster ironclad cruisers was for many years the predominant idea of our naval constructors and boards of admiralty. No one was more identified with the policy of their construction than the distinguished officer who has just returned as first sea lord to Whitehall. The tokens of increased vigor in the present board of admiralty, which Mr. Reed has gladly recognized, consist in the laying down of fresh specimens of these doubtful vessels. If ironclads are to be built, are these of the type which we require? The committee on naval designs reported against the policy of building them. The naval architect, who is now president of the council of naval construction at Whitehall, declared himself in evidence opposed to building more of them. But they have been built, they are being built, and they are about to be built, and Mr. Goschen will, we think, have much to do in justifying his policy to the country.

OUR ENGLISH LETTER.

Review of the British Iron, Steel, Coal, and Hardware Trades.

(From our Special Correspondent.)

Sheffield, Jan. 15, 1873.

Since my last, the principal topic in iron trade circles has been the great strike in South Wales. You have already been put in possession of the main features of this gigantic struggle, yet I must, so long as the strike lasts, record, for the edification of your readers, the various phases assumed during its progress. The decision to resist was arrived at on the Thursday, and on the Friday morning the colliers not only took out their tools, but marched away to other districts, seeking "fresh fields and pastures new." At one time, a well-informed gentleman says, pretty nearly one-fourth of the whole number employed had deserted the locality, crowding in inordinate numbers into the Rhondda valleys (where the sea-coal collieries are situated, and emigrating to Staffordshire, the Forest of Dean, and elsewhere, at the rate of 1000 per day. This exodus was necessarily too sudden and too great not to meet with an equally rapid check, which quickly ensued, and had the effect of driving back the malcontents—if I may so term them—to their native heath. An exception to this general statement may, nevertheless, be made in the case of some 600 or 700 firemen, railmen, and others, who have been sent into the North of England. The Irish laborers,

who are not scarce in the districts, are preparing to emigrate. The blow falls upon them as acutely as upon any other class; indeed, in a certain sense, they feel the effects of the strike more than the majority of the workmen. Of the 70,000 men of all classes affected, a decided minority—the colliers—are the unyielding faction, and until they give in, or their places are filled up, the miners, iron workers, and others, cannot, even if they were willing, recommence their work. The effects of this strike is not by any means confined to the principality, seeing that it has caused the Great Western Railway Company's rail mills and steam hammer shops, at Swindon, to be stopped, thus throwing some 400 men out of employment. I hear it stated that about 10,000 tons of coal have been sold at one of the Cannock Chase (near Birmingham) collieries, at an advance of 3s. per ton, for immediate delivery in South Wales. Further than this, the struggle in Wales has had the effect of sending up all kinds of coal in the Birmingham, East Worcestershire, and South Staffordshire districts 1s. 6d. to 3s. per ton, the precise causes assigned for the rise being "increased demand, resulting from the closing of the South Wales collieries, the diminished output arising from flooding of pits, and the coming into operation of the Mines Regulation Bill." "It's an ill wind that blows nobody any good," truly! Mr. Mundella, M. P., who invariably turns up in the neighborhood of a labor dispute, has attempted to pour the oil of arbitration (his own patent panacea) on the troubled waters, but hitherto has been entirely unsuccessful. The iron masters positively decline to submit to arbitration on any terms, and the probability is that they will adhere to that opinion. Mr. Crawshay (of the great Cyrfartha works) offers to allow one of two gentlemen named by him to inspect his books for the purpose of verifying his statement as to the price of rails—an offer supplemented by Mr. Richard Fothergill, M. P. (Plymouth works), who intimates, in his individual capacity, that he can see no good in another meeting between representatives of both sides, so long as the men "are influenced by strangers who flourish on the strife." Sir Ivor Guest, proprietor, or, at any rate, one of the leading proprietors, in the Dowlais works, where 11,000 men are usually employed, and in which concern he has some £800,000 (roughly speaking, four million dollars), has gone into Wales, and his visit may possibly result in some other step being taken shortly. On Friday a meeting of the Amalgamated Association of Ironworkers, including delegates from Wales, Staffordshire, Scotland, Lancashire, Yorkshire, Cleveland, and other ironmaking districts, was held at Darlington, to consider the Welsh strike. A resolution was passed to the effect that the council regretted that the disputes in Wales had led to a great strike, chiefly, in their opinion, owing to the action of the miners contrary to the resolution passed at the late conference of ironworkers; that they sympathized with the men out, and determined to make an immediate appeal to ironworkers throughout the country. This, I believe, is being done, but it is not exactly what the Welsh disputants were led to expect, and it has damped their courage in a considerable degree.

An almost unlimited number of strikes and labor disputes exist in different parts of the kingdom. Reports from Scotland state that much distress exists in County Kinross, the mills and factories being stopped for want of coal, and the colliers themselves being in a half-starved condition. In other parts of Scotland, the blast furnaces damped out have not yet been again put in blast; the Ayrshire coal masters have arrived at the conclusion that they will not pay miners more than 7s. 6d. per day. As a consequence of disputes elsewhere, the Fifeshire coal masters are overwhelmed with orders, which are being executed at enhanced prices. There, also, trouble is threatened, the associated miners of Fife and Clackmannan having resolved to resist the special rules drawn up by the masters under the new Mines Regulation Act. In addition to those already detailed, disputes exist with miners at Bedworth, Warwickshire; Moorewood's collieries, Derbyshire; and various other places—far too numerous to be referred to separately.

On Saturday miners' delegates from all parts of Great Britain assembled at Leeds and presented over £4480 to Mr. A. McDonald, president of the National Association of Miners, in recognition of the devotion and ability with which he has attended to their interests during the last 25 years. The presentation was made by Mr. Normansell, South Yorkshire, and several members of Parliament were present.

The several quarterly meetings held at the latter end of last week have given a decided tone to the iron market, and if in every instance a rise has not since been insisted upon, it must be held a *sine qua non* that all transactions are subject to special negotiations, list prices being entirely set aside. At the Birmingham and Wolverhampton quarterly meetings on Thursday and Friday, which were the most numerously attended on record, Staffordshire bars were not altered officially. Prices were fixed at: Bars, £11 to £13; singles, £15 to £16; hoops, £12 to £14; plates, £14 to £16 per ton; cinder pig sold well at £5; Shropshire hot blast, £6. 15s., and Shropshire cold blast, £7 to £7. 2s. 6d. per ton. Lord Dudley and Messrs. Barrow are selling their bars at £12. 12s. 6d. to £13, but Messrs. J. Bradley & Co., Philip Williams & Sons, John Bagnall & Sons, the New British Iron Company, and one or two other leading houses, agree to supply the London and Liverpool merchants with their usual quarterly requirements of bars at £12. The merchants in turn undertake to supply customers on that price as a basis. This step is a most prudent one, and is calculated, if properly worked out, to set the trade on a sure and safe footing. Sheets were in great request, as also were plates, but the high price of coal and coke caused great doubts to be expressed as to whether the present rate of production can be maintained for any lengthened period under the same conditions as now prevail.

The Birmingham trades are fairly brisk all round. Makers of tin plate and japanned goods are well employed, the demand mainly emanating from the American and colonial markets. It is quite possible that these goods may experience a rise very shortly, judging from the upward tendency of tin plate and tin. The smaller and multitudinous miscellaneous trades of "old Brum" are stated to be busy. Lockmakers, both of brass and iron descriptions, are in receipt of good orders from the home market, as also from the various British Colonies. Makers of harness and saddlery furniture have plenty of orders on hand from America, Australia, the Cape of Good Hope, and other markets; bridles are in especial request. Safe manufacturers are doing a good, steady business. Here, as elsewhere, the engineering trades, boiler makers, and gunmakers are well occupied, the last named mainly on American and Colonial orders for cheap rifles and revolvers. The military gun trade is not at present remarkably active, but the imitation jewelry branches are not less brisk than usual. In the general trades a good demand is anticipated from Canada, Holland, France, South America, and India. Copper and nickel have both gone up. Messrs. Evans & Askin, Birmingham, now quote 9s. per lb for metallic nickel, with 2½ off for cash in one month. This is an advance of 1s. per lb. Quotations for copper are now: tough ingot, £98; best selected, £100; sheets, £105; locomotive plates (plain), £107. 10s. Large lots are, however, being done at a trifle under these prices. Ordinary Chili bars realize £91. 5s. to £91. 10s.; choice brands, £92 cash; Wallaroo, £96 to £96 10s., and rough Japan, £90. At a meeting of the tin plate trade, held on Friday last, at Newport (Monmouthshire), which was well attended, prices were fixed at: I. C. charcoal plates 42s. per box; ordinary coke plates, 36s. per box at shipping ports. These quotations are 5s. or 6s. lower than last quarter, and as they are now the *real* prices, a good business is doing, but prices are stiffening rapidly. The Nantwit brand (known as the F arrow brand at Oporta), fetches 38s. to 39s. a box. Lead is steady at Birmingham, at from £21.15s. to £22 for good soft pig; sheets are worth £22. 10s. Spelter is firm. Silesian commands about £24; W. H., £24. 15s. to £25; Rhenish, £24 in London and outports; English, £24. 10s. to £24. 15s., delivered in Birmingham. The tin market is fairly firm, prices averaging about £143. Straits and Billiton have changed hands at 141s. at three months. English bars and blacks are about £1 higher than ten days ago. Australian ore has fetched £89. 5s. in one or two instances, in others 2s. 6d. to 5s. lower.

Having thus devoted a good deal of my space to the metropolis of the British hardware trade, I may note *en passant* that Derbyshire and Yorkshire pig iron is slightly stiffer, much of it having been sold for Staffordshire requirements, and the plates, bars, and sheets made by the famous Low Moor company are somewhat higher, the demand being, if anything, heavier than customary. Most of the Sheffield houses are now fairly at work, and orders are to hand with gratifying regularity and of fair bulk. With the United States and Canada a moderately brisk business is doing in general, cast, sheet, spring and Bessemer steel, in addition to which rods, rails, tires, axles and other miscellaneous goods are being dispatched in tolerably large lots. Hitherto no further action has been taken by the Steel Manufacturers' Association in the matter of limiting the demand for fuel, and, personally, I am of opinion that the whole thing will collapse without further action being taken.

Files, saws, edge tools and general engineering machinery are in request, a fair proportion of each kind coming across the Atlantic. Sheffield is also profiting—and, I may say, has been for years—by the craze for enormous armor-plates, Leviathan guns, and the like. One firm in the town indicated rolls armor-plates, fort shields and so on, up to 15 inches thick, with a total weight of fourteen or fifteen tons, at a frightful expense to the country, and their next neighbors manufacture the guns and shells which are, if possible, to be made to penetrate said armor-plates. One or the other is sure to beat, and as they do so pretty nearly in regular alternation, Sheffield can well afford to look on complacently—nay approvingly—seeing that the trials always furnish employment to her artizans. Some day or other the naval advisers of Her Britannic Majesty will wake to the dread knowledge that they have for years been wasting the money of their country by building a few huge, unwieldy, iron-cased sea monsters, instead of providing a *swarm* of swift, handy, small craft. Meantime the game goes merrily on, and, on an average, one ironclad gets aground or damaged weekly. At Middlesboro, and in the Cleveland district generally, prices are decidedly firmer. Pig No. 1, 117s. 6d.; No. 2, 115s.; No. 3, 110s.; No. 4, 109s. 6d.; mottled, 107s. 6d.; white, 107s.; refined metal £6 per ton. Manufactured iron hereabouts is priced as follows:—Common bars, nail rods, rails, £11 to £11. 10s.; best bars, cable iron, rivet iron, angle and bulb iron, £11. 10s. to £12; ship plates, £12. 10s. to £13; best best bars, £13 to £13. 10s.; hoops, £13. 10s. to £14; boiler plates, £14. 10s. to £14: sheets (singles), £15 to £15. 10s.; puddled bars, £8 to £8. 5s.; cast girders, £10 to £11; pipes (1¼in. to 24in. diameter), £9. 7s 6d. to £11; chairs, £6 to £6. 10s.; wrought girders, £20 to £21; bolt and nuts, £30 to £36 per ton. The associated masters' returns for December show that during the month the make of pig iron was 166,061 tons, being an increase of 2601 tons upon December, 1871, and an increase of 239 tons upon November, 1872; stocks have decreased from 40,987 tons to 40,697 tons during the month, and had the railway accommodation been sufficient stocks would have been 10,000 tons less. The stock at warrant store remains nominal, 931, as compared with December, 1871; foreign shipments of the month have increased from 19,796 tons to 32,334 tons. Coastwise shipments, on the other hand, have decreased from 16,083 tons to 9073 tons. For the whole of 1872 the make has been 1,968,972 tons, an increase of 84,733 tons over 1871; makers' stocks are 24,914 tons less than at the close of 1871, and at the warrant store they are 1799 tons less.

Iron for immediate delivery is not easy to obtain. During December, Middlesboro', Stockton, &c., sent 4508 tons of manufactured iron to Russia, beside large lots to the United States, West Indies, Spain, Norway, Germany, Belgium, Holland and other countries: A heavy tonnage of pig was also exported.

In Scotland a fair amount of business is doing, and would doubtless be greatly augmented were the colliers dispute settled. At Glasgow, the G M B warrants are now quoted at 124/. Many blast furnaces are damped down, and production is so irregular that no more really accurate figures for Scotch pig can be quoted than those in vogue three weeks ago, which may be accepted as being as nearly accurate as it is possible to be.

The total export of gun powder from the Clyde during 1872, amounted to 2,809,000 lbs., the largest total of any year since 1869. Of this there was sent to Valparaiso, 708,000 lbs.; to Melbourne, 768,000; Sidney, 278,000; Wellington, New Zealand, 40,000; Singapore, 80,000; China, 35,000; Colombe, 8000; The Brazils, 116,500; Monte Video, 62,500; West Indies, 12,500; Africa, 60,000; Halifax, Nova Scotia, 145,000; Lisbon and Malta, 405,000.

The following figures will probably be of interest to many of your readers, as showing, comparatively, the value of British metal exports:

Iron.	Month of Dec.		Twelve Months.	
	1871.	1872.	1871.	1872.
Pig and pud.	£190,817	£572,634	£3,229,408	£6,721,966
Bar, angle, &c.	241,788	243,316	2,921,777	3,635,558
Railroad.....	508,118	809,686	8,048,619	10,237,768
Wire.....	224,963	300,312	2,399,203	3,430,970
Teleg'phic do.	16,732	24,416	1,523,638	403,643
Cast and wr't	314,947	413,483	3,588,364	4,778,785
Hoop, sh't, &c.	224,963	300,312	2,399,403	3,430,797
Old iron.....	37,945	53,776	672,696	661,931
Steel, unwr't..	104,157	131,246	1,198,428	1,491,240
Tin plates....	237,796	227,204	2,900,625	3,812,744

Machinery and mill work show a marked increase, both on the month and the year. In 1871 the value of steam engines exported was £2,064,604; while during the last twelve months the value was £2,603,390; other descriptions of machinery were £3,902,037 in 1871, and £5,595,702 last year.

In coal, coke, and manufactured fuel, the exports showed an increase of about five hundred thousand tons on the year, but the value had increased more than £4,000,000, clearly showing the advance that has taken place. In 1871 the total quantity of coal and fuel exported was 12,747,989 tons, of the value of £6,246,133; while last year the quantity was 13,211,961 tons, of the value of £10,443,920.

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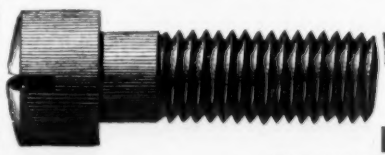

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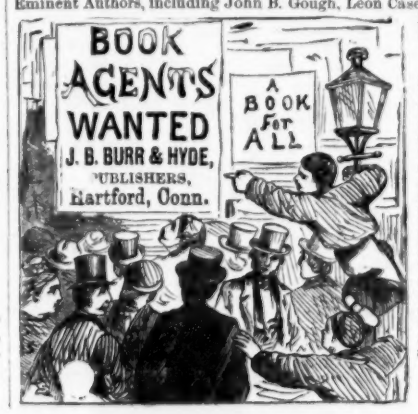

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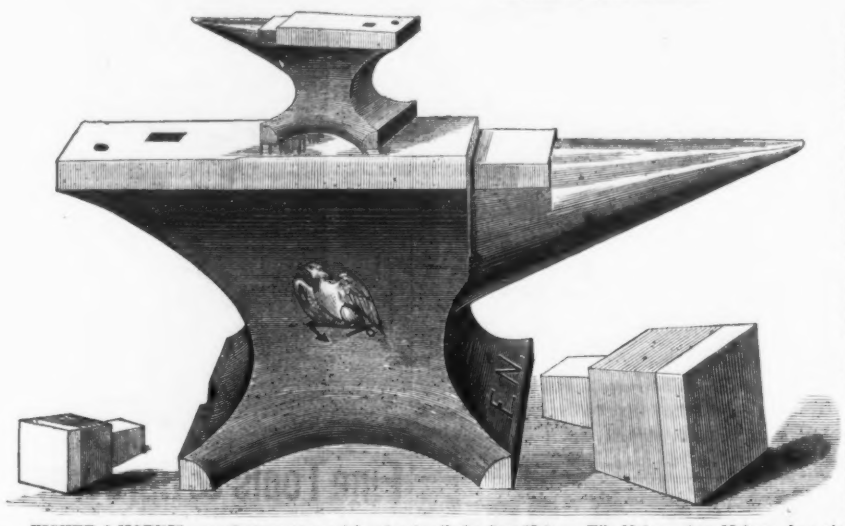

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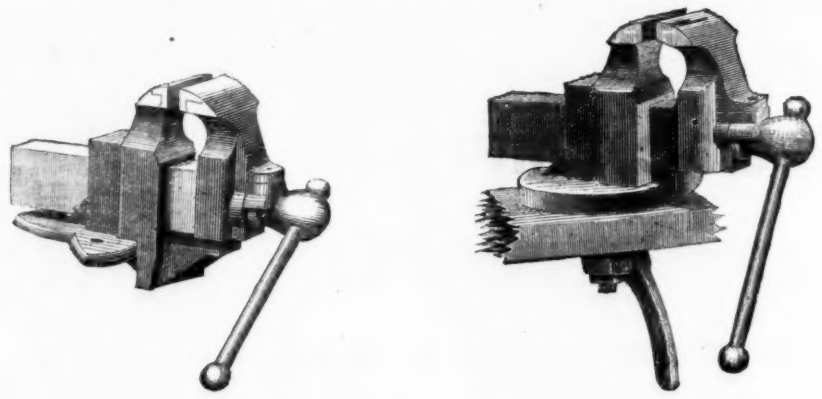

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3, 4, 6, 8, 10, 12 quar
16 20, 24, 32, 40 quar

RECOMMENDATION.

Messrs. SIDNEY SHEPARD & CO., Buffalo, N. Y.

Gentlemen: In reply to your inquiry, "How do you like our *Champion Freezer*?" would say, I hav tried all the different kinds of freezers in the market, but found none to answer my wants, consequently had one made at an expense of over two hundred dollars, that suits me. Your *Champion* embraces a the good qualities contained in my own, and I consider it the best I have seen. Yours, respectfully,

BUFFALO, Sept. 5th, 1872. J. MAYER, CONFECTIONER. No. 386 Main Street.

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With or without Convex and Concave Washers.

Jackscrews, Braces, Coffee Mills, Turning Lathes, Clamp Heads and Screws, Parallel Bench Vises, Sash Pullies, Ho House Pullies, Composition Cocks, Bench Screws, Vise Screws Gridirons, Drill Stocks and Bows, Box Chisels, Rivets, Sheaves, Block Pins, Composition Roller and Iron Bushings, Riggers' Screws, Caulkers' Tools, Pump Chambers, Belaying Pins, Marlin Spikes, Malleable Iron Castings, and Genera Hardware.

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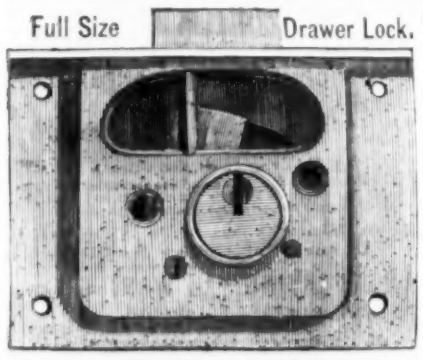
Full Size  Drawer Lock.

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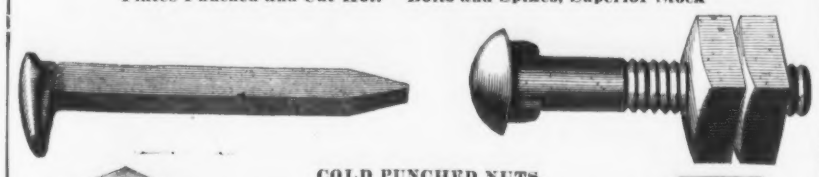

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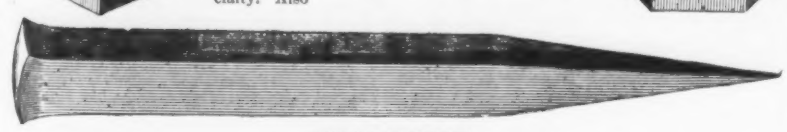

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Upper and Lower Hinges are alike, locking the top and bottom of the Blinds.

On long Blinds three or more may be used without mismatching sets, and all will fasten. They cannot be broken or closed by the wind.

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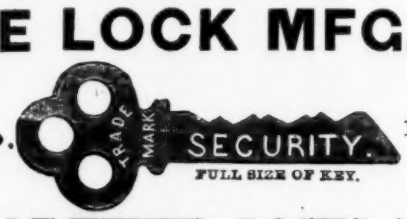

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RIM and MORTISE STORE DOOR LOCKS,

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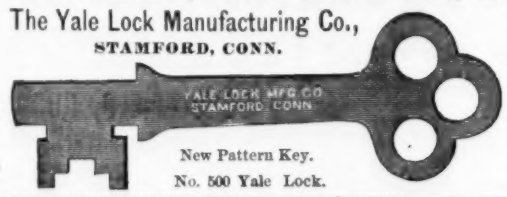

New Pattern Key.
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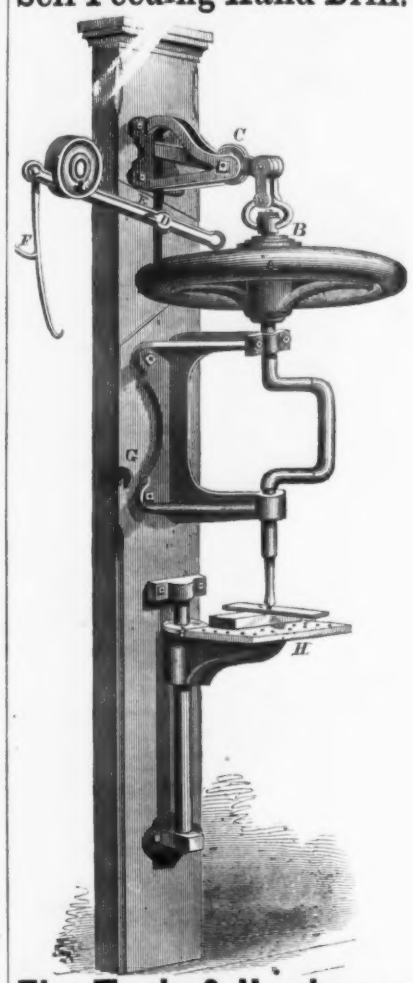

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STEEL and IRON SQUARES.

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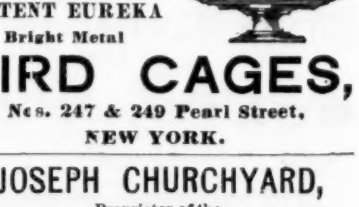

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Keeps on hand (or makes to order)

DOORS, SASH, MOULDINGS,

Shutters, Stairs, Blinds, Flooring, Siding, in hard and soft woods. Estimates given (responsible persons) for any variety of wood work, either plain or ornate Those in want of any thing in this line are invited to drop him a line and ascertain at cost price he can furnish it.

New York Wholesale Prices, February 5, 1873.

HARDWARE.

Anvils.
Solid Cast Steel ₱ lb 14c
Peter Wright's..₱ lb gold 12½c; over 250 lbs. 13c. gold
Armitage's Mouse Hole gold 12c
Wilkinson's ₱ lb gold 11½c
Eagle Anvil Co., ₱ lb 11 cts dis 15 @ 15&5 %

Apple Parers.
Turn Table, Lightning, Reading, Conqueror } $8·50 per dozen.
Union per doz. $8 00 @ 8 50
Bay State, Paring Coring & Slicing 13 50 @ 15 00
Skeleton " " " 8 00
Bay State Peach Parer 11 00 @ 11 50
Lightning Peach Parer 11 00 @ 11 50
Peach Stoner & Halver 6 00

Augers and Bits.
Snell Mfg. Co dis 15 %
Russell Jennings dis 10 %
Ives' dis 25 %
" Hollow Augers dis 30 %
" Expansive " dis 30 %
" Expansive Bits dis 25 %
Andrews' Bitts dis 30 %
Cook's Patent Augers dis 40 %
" " Bits dis 25&10 %
Shepardson's Double Cut Bits dis 20 %
Griswold's Patent dis 20 %
Cast Steel Cut Augers new list dis 25&10 %
Cast Steel Auger Bits dis 25&10 %
Long Augers new list dis 30 %
Bonney's Patent Hollow $48 per doz.—dis 25 %
Stearns' Patent Hollow $48 per doz.—dis 30 %

Axes.
Blood's $12 50 @ 14 00
Hunt's ₱ doz 15 00 @ 17 50 net @ dis 5 %
Collins' ₱ doz 12 00 @ 16 00 net @ dis 5 %
Hurd's ₱ doz 12 50 @ 13 50
Simmons' ₱ doz 12 00 @ 12 00
Morris' ₱ doz 12 50 @ 13 50
Red Jacket. ₱ doz 12 00 @ 12 50
Mann's ₱ doz 13 00 @ 14 50
Powell Tool Co., "Peerless" ₱ doz 13 00 @ 14 50

Balances.
Chatillon's, Frary's, Morton's } new list, dis 15 %

Bands.
Plated add 10; dis 5 %
Iron dis 5 %
Brass....(Plated list) dis 5 %
Oroide add 25; dis 5 %

Bells.
Hand, Light Brass dis 50&10 %
White Metal dis 45&10 %
Globe dis 20 %
Abbe's dis 10 & 10 %
Taylor's Patent Door net
Western Gong net
Brook's Crank net list.
" Pull dis 15 %
Hart Mfg. Co., Crank and Pull net list
Cow—Common Wrought new list dis 33⅓ %
Western new hst dis 33⅓ %
Kentucky "Star" new list dis 20 @ 20&10 %
Dodge's Genuine Kentucky new list dis 25 %
Yaw.s Genuine net

Bellows.
Blacksmiths' dis 10 %
Moulders' dis 10 %

Blind Fasteners.
Van Sand's ₱ gross $14 00
Washburn's Patent ₱ gross 14 00
Merriman's add 35 @ 40%

Blind Staples.
Boardman's Patent, ½ in. and larger ₱ lb 37½c
" ⅜ in. " 42 c

Bolts.
Cast Iron Barrel, Shutter, &c..old list dis 30&10 %
Wrought Iron Barrel net
" " Square dis 10&10 %
Carriage and Tire, Common dis 60&5 %
Carriage and Tire, Norway Iron dis 40 %
Eagle, Philadelphia dis 40 %
Philadelphia Pattern, P. S. & W dis 50&5 %
Carriage and Tire, R. B. & W
Plow, R. B. & W
Stove R. B. & W
Union Nut Co
Machine dis 10 @ 15 %

Boring Machines.
Kellogg's dis 10 @ 15 %
Snell Mfg. Co., Rice's Patent dis 15 %
Snell Mfg. Co., Regular dis 15 %
Douglas Mfg. Co dis 20 %
Hovey's Angle $6 00 @ 6 25
Hovey's Upright 4 25 @ 4 50
Morticing Machines, each $18 00

Braces.
Barber's Patent dis 30&10 %
Wilson Mfg. Co net @ add 5 %
Spofford's Patent dis 37½ %
Noble's Patent dis 33⅓ %
Bartholomew's dis 10 %
Bartholomew's Patent dis 25 %

Bung Hole Borers.
Common and Ring dis 20 %
Enterprise Mfg. Co dis 20 %
Ives' Tap Borers dis 20 %

Butchers' Cleavers.
Bradley's dis 15 %
Beatty's new list dis 10 %

2	3	4	5	6	7	8	9
$19·00	$21·50	$24·00	$27·00	$30·00	$33·50	$36·50	$40·00

Hart Mfg. Co dis 15 %

0	1	2	3	4	5	6
$13·00	$16·00	$18·00	$20·00	$23·00	$26·00	$30·00

Butts.
Wrought Brass new list dis 25 %
Cast Fast Joint Narrow dis 15 %
" " " Broad dis 30 %
Cast Loose Joint dis 40 %
" " " Mayer dis 30 %
" " " Parliament dis 30 %
Loose Pin Butts, Plain dis 25 %
" " Japanned dis 25 %
" " National dis 40 %
Wrought Fast Joint, Narrow net
Wrought Broad dis 15 %
" Loose dis 15 %
Wrought Table and Back Flaps net
Palmer Blind Butts dis 30&10 %
Nicholson Blind Butts dis 30 %
Parker's Blind Butts dis 30 %
Clark's Blind Butts dis 30 %
Seymour's dis 30 %
Shepard's dis 30 %
Garretson's dis 40 %
Standard dis 30 %
Union Mfg. Co.'s Drilled Fast Narrow new list dis 25 %
" " " " " Broad dis 25 %
" " " " Loose dis 35 %
Whitney & Wait's Bronze Metal dis 20 %

Caps—Percussion per 1000.
G. D. 40c
Ely's E. B. 1-4s, 67½c; 1-10s, 75c, gold
" Double Waterp'f, 1-4s, $1·57½; 1-10s, $1·65c, gold
Cole's 1-4s, 82½c; 1-10s, 90c, gold

Cartridges.
Metallic dis 45 %

Cards.
Horse and Curry dis 20&10 %
Cotton and Wool dis 10 %

Casters.
Iron and Wood Wheel Plate new list dis 20&10 %
Brass Wheel Plate new list dis 20&10 %
Porcelain Wheel Plate new list dis 20&10 %

Chain.—By the Cask.
English Coil net gold

₱ lb.	13½	10½	9½	9c	8¼	8½
	3-16	¼	5-16	⅜	7-16	½

Trace, 6½-10-2 ₱ pair, gold, 65c
Trace, 7-10-2 ₱ pair, gold. 70c
Galvanized Pump Chain ₱ lb 14c
German Halter Chain new list, gold, dis 10 %
German Coil new list, gold, dis 10 %
Jack Chain, Iron dis 35 @ 40 %
" " Brass dis 20 @ 25 %

Chalk.
White ₱ gross, 50c
Red ₱ gross, 75c
Blue ₱ gross, 85c
Crayons ₱ gross, 14c

Chisels.
Socket Firmers dis 60 %
Socket Framing dis 60 %
Socket Corner dis 60 %
} Cash in 30 days an extra 5 %
Tanged Firmers dis 40 @ 40&10 %
Butcher's $5 00 to £ gold—new list
Spear & Jackson's $5 00 to £ gold—new list

Clips, Axle.
Norway or Best dis 20 @ 30 %
Superior dis 40&5 %

Coal Shovels.
Iron Handled ₱ doz, $ 85 @ 1 25
Wooden Handled ₱ doz, 1 00 @ 2 00

Coal Hods.
Smith, Burns & Co. dis 25 %

No.	14	15	16	17	18	
Japanned,	$9·00	9·75	10·50	12·00	13·50	per doz
Galvanized,	13·00	14·50	15·50	17·50	19·50	"

Cocks.
Brass Racking dis 10&10 %
Lock & Globe dis 10 %

Coffee Mills.
Common Board and Box dis 15 %
Better Grades dis 10 %
Increase Wilson's new list dis 10 %
French Steel dis 10 @ 20 %
"Champion" dis 20 %

Compasses and Dividers.
Bemis dis 15&15 @ 20&5&15 %
Excelsior dis 30 %
Peck, Stow & Wilcox dis 20 %

Coopers' Tools.
Bradley's dis 15 @ 20 %

Corn Knives and Cutters.
Bradley's list net

Curry Combs.
Hotchkiss' and Kellogg's, Iron and Brass dis 10 %
Fitch's dis 20 %
Ruggles' dis 15 @ 20 %
Rubber ₱ doz., $9 00—dis 10 %

Curtain Pins.
Silvered Glass dis 40&10 %

Cutlery.
American Table
American Pocket dis 15 %

Door Springs.
Torrey's Patent $7 50 ₱ doz—dis 20&10 %
J. Palmer ₱ doz $5 50

Drawing Knives.
dis 60 %—Cash in 30 days an extra 5 %
Bradley's dis 25 %

Drills.
Morse's Bit Stock Drills dis 10 @ 15 %
Ingersoll's Ratchet (Wrought Iron) dis 25 %
No. 1, 12-in., $6 50 each; No. 2, 16-in., $8 75 each; No. 3, 20-in., $11 00 each.

Egg Beaters.
Monroe's ₱ doz net $8 25 @ 8 50
Ashley's ₱ doz net 2 25 @ 3 60
Earle's Patent ₱ doz net 5 50 @ 6 00
Pratt's Aerating dis 10 %
Dover ₱ doz net $6 00

Emery.
Genuine Chester—Regular Nos. ₱ lb 8c
" Flour and FF ₱ lb 5c
Washington Mills—Regular Nos. ₱ lb 8c
" Flour ₱ lb 5c

Enameled and Tinned Ware.
Kettles dis 10 %
Sauce Pans, Glue Pots, &c dis 5 %

Faucets.
Cork Lined, Wood dis 50 @ 50&10 %
Fenn's dis 50 %
" Cork Stops dis 40 %
Star dis 57½ %
Frary's Patent Petroleum dis 10 & 10 %
Taylor's Pattern Petroleum dis 20&10 %
Wood and Metallic" dis 40 %

Files.
American Best $5 00 to £ net
Nicholson—Mill 5 00 to £ net
" Others 5 00 to £ net
" Tapers (single cut) 5 00 to £ net
J. & Riley Carr's, 5 50 to £ gold
Stubs' 8 00 @ 8 25 to £ gold
Butcher's 5 50 to £ gold
Spear & Jackson's 5 50 to £ gold
Hargreaves, Smith & Co.'s 4 75 to £ gold
Jowitt's 5 25 to £ gold
"Western" 5 00 to £ net
W. K. & C. Peace's "Imperial" 5 25 to £ gold
R. Ibbotson 5 00 to £ gold
Beam & Murray, "Cyclops" 4 85 to £ gold
Fisher,s 4 75 to £ gold
Goodlad's 4 00 to £ gold
Moss & Gamble 5 25 @ 5 50 to gold

Fluting Machines.
Acme $7 00 each net
Cole 5 75 each net
Peerless, No. 2 4 00 each net
Manvill, No. 2 7 00 each net
Knox, with 4-inch Rolls 5 00 each net
" " 6 " " 6 00 each net
O. K. 6 50 each net
Excelsior, No. 1 4 75 each net
" " 2 6 50 each net
Diamond 7 50 each net
Climax, 7-inch Rolls 8 00 each net
" 4½ " " 6 50 each net
Empire 4 00 each net
Eureka, No. 1, 7-inch Roll 8 00 each net
" No. 2, 5-inch Roll 6 00 each net
K. F. M., 4½ inch Roll 5 50 each net
" 6-inch Roll 6 00 each net
Carpenter's Self-Heating 13 50 each net
Fairy, Self Heater 10 00 each net
National, 5-inch Rolls 5 00 each net
Myer's Fashion Fluter, 4½ inch Rolls 3 00 each net

Fry Pans.
Tinned— dis 20 %

₱ doz	$3·00	3·25	3·62	4·00	4·50	5·00	5·50	6·00	7·50
No.	0	1	2	3	4	5	6	7	8

Peck, Stow & Wilcox dis 20 %
Smith, Burns & Co., "Excelsior" Polished dis 20 %

$3·70	4·00	4·70	5·30	6·00	7·00	8·00	9·00 per doz.
No. 1	2	3	4	5	6	7	8.

Hammers.
Maydole's new list net
Chency's new list net
Verree dis 5 %
Yerks & Plumb new advanced list dis 5 @ 10 %

Handles.
Hammer and Hatchet dis 10 %
Quakertown, Axe, Pick and Sledge dis 10 %
" Hammer and Hatchet net

Harness Snaps.
Judd's dis 30 %
Fitch's dis 30 %

Hatchets.
Isaiah Blood dis 10 %
Shingling, Nos. 1 2 3 ₱ doz $7 50 8 00 8 50
Claw, " 1 2 3 ₱ doz 8 50 9 00 9 50
Lathing, " 1 2 3 ₱ doz 7 50 8 00 8 50
Hurd's dis 20 %
Shingling, Nos. 1 2 3 ₱ doz $8 00 8 50 9 00
Claw, " 1 2 3 ₱ doz 9 00 9 50 10 00
Lathing, " 1 2 3 ₱ doz 8 00 8 50 9 00
Newark Edge Tool Co's dis 25 %
Shingling, Nos. 1 2 3 ₱ doz $6 50 7 00 7 50
Claw, " 1 2 3 ₱ doz 7 25 7 75 8 25
Lathing, " 1 2 3 ₱ doz 6 50 7 00 7 50
Yerks & Plumb dis 10 %
Shingling, Nos. 1 2 3 ₱ doz 7 00 7 50 8 00
Claw, " 1 2 3 ₱ doz 7 50 8 00 8 50
Lathing, " 1 2 3 ₱ doz 7 00 7 50 8 00
Simmon's dis 10 @ 15 %
Shingling, Nos. 0 1 2 3 ₱ doz 7 50 8 00 8 50 9 00
Claw, " 1 2 3 ₱ doz 9 00 9 50 10 00
Lathing, " 1 2 3 ₱ doz 8 00 8 50 9 00
Broad, " 1 2 3 ₱ doz 9 00 10 00 12 00
" " 4 5 6 ₱ doz 14 00 16 00 18 00
" " 7 8 ₱ doz 20 00 22 00
J. P. Verree & Co dis 5 %
Shingling, Nos. 1, 2, 3 ₱ doz $7 00 7 50 8 00
Claw, " 1, 2, 3 ₱ doz 7 50 8 00 8 50
Lathing, " 1, 2, 3 ₱ doz 7 00 7 50 8 00

Hinges.
Wrought Strap and T net
Providence Plate 6 & 8 in. list 11c; over 8 in. " 9½c dis 5 %

Hoes
Solid Shank, C. S ₱ doz $8 00—dis 25 %
Socket, C. S ₱ doz 9 00—dis 25 %
Riveted Eye ₱ doz 5 00—dis 25 %
Planters'—Winsted add 10 %
Scovill add 33⅓ %
Scovill Pattern (Winsted) add 20 %

Hooks.
Belt dis 50 %
Bench ₱ doz net $5 00 @ 8 50
Wardrobe, Japanned new list dis 10&10 %
Hat and Coat " new list dis 10&10 %
Wrought Staples and Hooks and Staples dis 60 %
WroughtHasps and Staples and Hasps, Hooks and
Wrought Staples dis 60 %
Screw Hooks and Eyes, revised list dis 60 %

Horse Nails.
Putnam's.

No.	5	6	7	8	9	10
	32c	28c	26c	25c	24c	23c

In lots 1000 lbs. dis. 5 %.
Ausable.

No.	5	6	7	8	9	10
	30c	27c	25c	24c	23c	22c

In lots of 1000 lbs. 5 % discount.
Brundage.

No.	5	6	7	8	9	10
	29	26c	24c	23c	22c	21c

In lots of 500 lbs., dis 5 %
American Pressed.

No.	5	6	7	8	9	10
	22c	20c	20c	20c	20c	20c

Perkins Finished, (ready to drive).

No.	5	6	7	8	9	10
	29	26	24	23	22	21c

Buffalo Forged.

No.	6	7	8	9	10
	28c	26c	25c	24c	23c

Globe (Pointed and Polished).

No.	5	6	7	8	9	10
	31c	28c	26c	25c	24c	23c

In lots of 1000 lbs., 5 % discount.
National (Pointed and Polished), Extra Finish.

No.	5	6	7	8	9	10
	30c	27c	25c	24c	23c	22c

In lots of 1000 lbs.. dis 5 %.
Vulcan.

No.	5	6	7	8	9	10
	33c	30c	28c	27c	26c	25c

In lots of 500 lbs., 5 % discount.
" 1000 lbs., 7½ % discount.
New London Horse Nails.

No.	6	7	8	9	10
Great Western	27c	25c	24c	23c	22c
WB.	29c	27c	26c	25c	24c

In lots of 1000 lbs., dis. 5 %.
Star Brand ₱ lb 16c
Morgan 16c

Horse Shoes.
Burden ₱ keg, $6 10
R. I. Horse Shoe Co., Perkins' Pattern ₱ keg, 6 10
" " R. I. Pattern ₱ keg
Mule Shoes ₱ keg, 7 10

Kettles.
Enameled dis 10 %
Brass ₱ lb 55c
In lots of 500 lbs ₱ lb net 50c

Knives.
Butcher and Shoe, "Ames'" dis 15 %
Hay and Straw, "Wadsworth's" dis 15 %

Knobs.
Mineral and Porcelain, Trenton Lock Co } list June 8th, dis 25 %
Mallory, Wheeler & Co new list dis 40&2 %
Base—Common net
" Plush Tip dis 10 %
Elastic End reduced list..dis 10&10 %

Lanterns.
Brady's Patent dis 10 %
Ætna dis 10 %
Yankee dis 10 %
De Beque dis 10 %

Locks and Latches.
Russell & Erwin Mfg. Co., Norwalk Lock Co., Branford Lock Co., Parker & Whipple, Nashua Lock Co., Trenton Lock Co. } Dis. 25 %
Mallory, Wheeler & Co revised list, dis 40&2 %
Pad Locks, (Mallory, Wheeler & Co) new list dis 40 %
Pad Locks, (R. & E. Mfg. Co).
Revised list Sept. 10th, dis 40&2 %
Cabinet—Eagle dis 25 %
Cabinet—Gaylord dis 25 %
Trunk dis 10 %
Continental dis 15 %
Shepardsons dis 20 %

Meat Cutters.
Dixon's (P. S. & W) dis 5 %

No.	1	2	3	4
₱ doz	$14 00	$17 00	$19 00	$30 00

Hales' dis 10 %

No.	11	12	13
₱ doz	$27 00	$33 00	$42 00

Perry's Champion (P. S. & W) dis 5 %

No.	200	300	400
₱ doz	$22 00	$27 00	$40 00

Woodruff's (P. S. & W) dis 5 %

No.	100	150
₱ doz	$15 00	$18 00

American dis 25 @ 25&5 %

No.	1	2	2½	3	4	5
Each	$6 00	$9 00	$14 00	$15 00	$30 00	$75 00

Molasses Gates.
Stebbins' Pattern dis 50&10 %
Tinned ends dis 40&10 %
Weed's Patent Self-Boring dis 15 %
" without Auger Bit dis 40 @ 50 %
Patent Self-Measuring per doz $42 00—dis 20 %

Mouse Traps.
Wood Choker 22 @ 24c ₱ doz holes

Nails.
10d Cut (Standard) ₱ keg $5 00

Nuts and Washers.
Cold Cut Nuts 3c off list
Hot " " 3c off list
Washers less 6c off list

Oil Stones.
Washita No. 1 ₱ lb 22c @ 25c
Washita Slips ₱ lb 44c @ 50c
Hindostan ₱ lb 6c net
Hindostan Slips ₱ lb 10c net

Oilers.
Olmsted's dis 25&10 %
Broughton's dis 25&5 %
Common Zinc, Brass and Copper dis 20 %

Picks.
Washoe R. R. Nos. 1 3 3 4 5
per doz. $14·00 15·00 16·00 17·00 18·00
Washoe Coal, " $8·50 9·00 10·00 11·00 13·00 15·00

Picture Nails and Knobs.
Richards' Patent dis 40 @ 40&10 %

Planes.
Auburn Bench and Fancy dis 15 %
Bailey's Patent Adjustable dis 15&10 %
Howland's Bench and Fancy dis 15 %
Chapin's " " dis 15 %
Chapin's, 2d quality dis 15&5 %
Sandusky Tool Co. dis 15 %
Ogontz" dis 15&5 %
Plane Irons list net
" " Butcher's $5 00 to £ gold—new list
" "Spear & Jackson's $5 00 to £ gold—new list
" " Sandusky Tool Co list net

Pumps.
Douglas Cistern, etc new list dis 25 %
" S. & F. new list dis 20 %

Rakes.
Cast Steel dis 25

$8 00	$9 00	$10 00	$11 00
8	10	12	14 teeth.

Razor Straps.
Genuine Emerson (R. F. Badger) dis 33⅓ %
Hunt's dis 25&10 %
Chapman dis 10 @ 15 %

Rivets.
Iron and Tinned dis 25 %
Copper Rivets and Burrs net @ dis 10 %

Rods.
Stair new list dis 25 %
American Patent dis 25 %

Rope. Manufacturers' List.
Manila, ½ inch and larger ₱ lb 18c
" ⅜ inch ₱ lb 18½c
" ¼ & 5-16 inch ₱ lb 19c
" Lath Yarn ₱ lb 19c
" Hay Rope ₱ lb 18½c
Jute ₱ lb 12c
Sisal, ½ inch and larger, ₱ lb 16c
" ⅜ inch ₱ lb 16½c
" ¼ & 5-16 inch ₱ lb 17c

Rules.
Boxwood and Ivory dis 50&10 %

Sad Irons.
₱ lb 5½ @ 6c
Myer's Hat and Toilet, with stand per doz $7 00

Sand Paper—dis 7½ @ 10 %
Beader & Adamson's (Flint) 00 to 1½ ₱ ream $1 50
" " " 2, 2½ &3 ₱ ream 3 00
Assorted ₱ ream 50
Star ₱ ream $3 50
Emery ₱ ream $7 00 @ 12 00

Sash Locks.
Clark's dis 25 @ 30 %
Ferguson s dis 20 @25 %
Champion per gross $13 00 @ $15 00
Norwich dis 15 %

Sash Weights.
Solid Eyes ₱ lb 3¼c

Sausage Fillers.
Perry's (P. S. & W) dis 5 %

No.	1	0
₱ doz	$15 00	$21 00

Saw Rods.
list net

Saws.
Spear & Jackson's $4 50 to £ gold
John Spear $3 66 to £ gold
Am. Saw Co new list
Perforated Cross Cuts, all kinds 68c per foot
Inserted Tooth dis 10 %
All else dis 12½ %
Disston's Cross Cut, Circular and Mill dis 12½ %
Hand, Panel, Back, &c dis 7½ %
Butcher Bow Saws, Butcher Saw Blades, Hack Saw Blades dis 12½ %
H. W. Peace s Circulars dis 10 %
Other kinds dis 10 %
Wm. McNiece's Hand, Cross Cut and Circular new list dis 10 %
Lightning new list..dis 20&12½ %

Scales.
Fairbanks' new list dis 15 @ 20 %
Howe's dis 15&5 %
Shattuck's Counter and Union dis 15 %
National Platform dis 25 %
Eureka dis 25 %
Scale Beams dis 20 %
No. 1 360 to 1200 lbs 90c. ₱ cwt
No. 2 " " 75c ₱ cwt

Screws.
American and National Screw Cos.
Iron revised list dis 50 %
Round Head Iron dis 40 %
Brass dis 40 %
Round Head Silver Capped new list dis 20 %
Patent Gimlet Point Coach and Hand Rail..dis 10 %

Scythes.
Blood's German Steel, Grass ₱ doz $10 00
" Cast " " ₱ doz 11 00
" Silver " " ₱ doz 12 00
" German " Grain ₱ doz 14 00
" Cast " " ₱ doz 15 00
" Red Rover 13 00
" Young America 10 50
" Silver Clipper 12 63
Johnson's German Steel, Grass ₱ doz 9 25
" Cast " " ₱ doz 10 50
" German " Grain ₱ doz 12 00

Shears.
Cast Steel dis 60 @ 60&5 %
Seymour's
Conn. Cutlery Co., new brand dis 60 %

Shovels and Spades.
Ames list July 1, '70, list net @ dis 2½ %
Rowland list Feb. 17, '72, dis 5 %
Old Colony dis 2½ %

Shovels and Tongs.
Iron Head list net
Brass Head dis 5 %
Polished Steel new list dis 15 %

Slates.
Square Frames, R'd Corn'd, by case dis 60&10
Less than a case dis 50 @ 55
Oval Frames, by case dis 40 @ 40&10
Less than a case dis 30 %

Spoons.
Iron new advanced list dis 10 %
By the case dis 20
Britannia dis 20 %
Plated A 1 dis 25&5 %
German Silver add 5 %
Tinned (P. S. & W.)—
Teas $1.50 ₱ gross, net
Tables 2·75 "

Stocks and Dies.
dis 15 @ 20 %

Stove Polish.
Joseph Dixon's ₱ gross $6 00 @ 6 25
Gold Medal ₱ gross $5·50

Squares.
Steel dis 50 %; full cases, dis 50& 0
Iron dis 50 %; full cases, dis 50&10
Nickel Plated add $2 50 @ $4 00 ₱ doz net
Try Squares and T Bevels dis 40&10
Star Try Squares and Bevels dis 20

Tacks.
Full Weight American Iron dis 40&7½
Half Weight American Iron dis 70&7½ %
Carpet dis 7½ %
Brads American dis 50&7½ %
Finishing Nails ½ ⅝ ¾ ⅞ 1 in. and over
₱ lb 25 20 17 14 12½c dis 7½ %
Trunk and Clout ½ ⅝ ¾ ⅞ 1 in. and over
₱ lb 25 20 17 14 12½c dis 7½ %
Copper Tacks ₱ lb 56c—dis 7½ %
Iron Shoe Nails, ₱ lb 4-8 and longer, 10c; 3⅜-8, 10½c dis 7½ %
Double Pointed new list dis 33⅓ %

Tapes, Measuring
American Flask and Cap Co dis 20 %
Eddy's dis 10&10 %

Toe Calks.
per lb 18c

Tobacco Cutters.
Champion dis 20 %
Peck, Stow & Wilcox dis 10 %

Traps.
Newhouse dis 17½ %
Hotchkiss dis 20 %
Peck, Stow & Wilcox dis 30 %
Blake's Patent dis 15 @ 20 %

Vises.
Trenton Vises, Solid Box.
30 to 110 lbs 17c
111 to 160 lbs 18c
160 and over 21½c
Peter Wright's ₱ lb 15½c. gold
Wilson's Solid Box dis 10 %
39 to 160 lbs. 18c
160 and upward 21c
Jameson's Parallel dis 25&10 %
Backus, Parallel dis 25&10 %
Union, Parallel dis 25%
Buffalo, Parallel new list dis 15 %
Fisher & Norris' Double Screw Par...dis 15 @ 15&5%

Wire.
Bright and Annealed Nos. 0 @ 18 dis 20 @ 25 %
" " Nos. 19 @ 26 dis 20 @ 35 %
" " Nos. 27 @ 36 dis 35 @ 40 %
Coppered Nos. 0 @ 18 dis 15 @ 20 %
Galvanized dis 25 @ 40 %
Tinned dis 15 @ 20 %
Cast Steel net @ 5 %
Tinned Broom Wire dis 20 @ 25 %
Galvanized Telegraph, Nos. 8 & 9 ₱ lb 10 @ 11c
" " " 10 & 11 ₱ lb 11 @ 12c
" " " 12 ₱ lb 11½ @ 12½c
Annealed Fence, Nos. 8 & 9 dis 20 @ 25 %
" Grape, " 10 to 14 dis 20 @ 25 %
Fence Staples ₱ lb 10c

Wrenches.
Baxter's Adjustable "S" dis 20 %
Baxter's Diagonal dis 20 %
Collins & Co.'s new dis list 30 %
Coes' Genuine dis 30 %
Coes' Pattern (Wrought) dis 45 %
" " (Malleable) dis 50 %
Lindsay's Patent dis 25 %
Taft's Pattern dis 60&15 %

METALS.

IRON.—DUTY: Bars, 1 to 1¼ cents per lb. Sheet, Band, Hoop and Scroll, 1¼ to 1¾ cents per lb. Provided, that none of the above Iron shall pay a less rate of duty than 35 per cent. Pig, $7 per ton; Polished Sheets, 3 cents per lb.; Wrought Scrap, $8 per ton; Cast Scrap, $6 per ton. All subject to a reduction of 10 per cent. Railroad, 70 cents per 100 lbs., Boiler and Plate, 1¼ cents per lb.

Pig Iron.

AMERICAN.
Foundry No. 1 Lehigh ₱ ton $48 00 @ 50 00
Foundry No. 2 " 47 00 @ 49 00
Gray Forge " 40 00 @ 42 00
White and Mottled "

SCOTCH.
Gartsherrie nominally " 59 00 @ 60 00
Coltness " " 60 00 @ 62 50
Glengarnock " " 57 00 @
Eglinton " " 55 00 @

Bar Iron.
Am. Refined, at mill ₱ ton, 100 00 @

Rails.
Welsh, gold ₱ ton, 72 00 @ 74 00
American, at works, currency " 80 00 @
Old Rails, D. H., gold " 52 00 @ 53 00

Scrap Iron.
Wrought Scrap, from store. " 57 50 @ 60 00

Bar Iron from Store.

Common Iron.		
¾ to 2 in. round and square	₩ ton	$100 00
⅝ x9-16 in. " " "	"	105 00
⅝ in. " " "	"	107 50
2½ to 3 in. " " "	"	105 00
o 6 in. wide x ⅜ and 1 in. thick	"	100 00
½ to 6 in. wide x ¼ & 5-16 in. thick	"	105 00
and 1⅛ in. x ¼ and 5-16	"	107 50
wedish Iron.		
1¼x⅜ and ½	₩ ton	155 00
1½x⅜ to ⅝, and ¾ square	"	150 00
1¾ to 5x⅜ to ¾ and ⅞ to 2-in. square	"	145 00
6 to 12x⅜ and ½	"	155 00
Refined Iron.		
¾ to 2 in. round and square	"	105 00
1 to 6 in. wide x ¾ to 1 thick	"	105 00
1⅛ to 6 in. wide x ¼ and 5-16 thick	"	110 00
1 and 1⅛ x ¼ and 5-16	"	112 50
arge Rounds.		
2⅛ to 2⅞, round and sqnare	"	122 50
3, 3⅛ and 3½ in	"	117 50
3¾ and 4 in	"	125 00
Rods—½ and 11-16, round and square	"	110 00
⅜ and 9-16, " "	"	115 00
7-16, " "	"	117 50
½, " "	"	122 50
5-16, " "	"	127 50
¼ " "	"	132 50
3-16, " "	"	152 50
and Iron.		
1 to 6 in. x 3-16 to No. 12	"	122 50
Horse Shoe Iron.		
¾ and ⅞ x ⅜, to ½	"	127 50
1 x ¼, to ½	"	117 50
Ovals, Half Ovals and Half Rounds.		
¼ to 1½	₩ ton	130 00
⅝ and 11-16	"	135 00
½ and 9-16	"	140 00
7-16	"	145 00
⅜	"	150 00
Nail Rods		
UB	₩ ℔	9c
Norway Shapes		
⅛ to 2 in x ¼ to ¾	"	8½c
¼ to ¾ square	"	8½c
Norway Bar.		
⅛ to 2 in. square	"	7¾c
Spring Steel.		
1 to 4 in. wide	"	10c
Tire Steel		
⅞ to 1¼ x ¼ & 5-16	"	10½c
⅞ & 1 x 3-16	1	c
⅞ & 1 x ⅛		
Toe Calk Steel		
½ to ⅞ x ⅜ to ½	"	8½c
Plow Steel.		
6 to 16 wide	"	9¼c
Sleigh Shoe Steel		
¾ to 1⅛ x ⅜ to ½ Stock	"	8½c
ops, ⅝ x No. 22	₩ ton	172 50
" ⅜ x No. 20	"	142 50
" ⅞ x No. 19	"	137 50
" 1 and 1¼ x No. 18	"	132 50
" 1¼ to 2 and 1x1¼ x No. 13 & 14	"	127 50
crol Iron—½x12	"	150 00
" " 10	"	140 00
" " 3-16	"	135 00
" " ¼ and 5-16	"	130 00
" ⅛ x 14	"	145 00
" " 12	"	140 00
" " 10	"	135 00
" " 3-16	"	130 00
" " ¼	"	125 00
" ¾ x 14	"	137 50
" " 12	"	135 00
" " 10	"	130 00
" " 3-16	"	125 00
" " ¼	"	122 50
" " 5-16	"	122 50
" ⅝ x 14	"	132 50
" " 12	"	130 00
" " 10	"	125 00
" " 3-16	"	122 50
" " ¼	"	120 00
" " 5-16	"	120 00

Sheet Iron.

	English.	American
Nos. 10 to 20	₩ ℔ 6¼c	8c
21 to 24	" 7¼c	8¼c
25 to 26	" 7¼c	8¼c
27	" 7¾c	8¾c
28	" 8c	9c
30	" 8½ @ 9c	
Galvanized, 10 to 20	₩ ℔	12c
21 to 24	"	13c
25 to 26	"	14c
27	"	15c
Patent Polished	"	15 c
Russia Nos. 8 @ 11,	"	20c @ 22 c
" Nos. 12 @ 16,	"	20c @ 22 c
Belgian	"	13 c

One piece Corrugated Sheet Iron Elbows.

CHARCOAL IRON.

4½	5	5½	6	7 inch.
$3 75	4 25	5 25	5 25	6 50 per doz.

RUSSIA IRON.

4½		5½	6	7 inch.
$7 00	00	13 00	13 00	14 00 per doz.

Brass.

ROLLED AND IN SHEETS.

(Brown & Sharp's Gauge.*)

For the purchase of 100 pounds and over at one me :

HIGH BRASS.

All Nos. to No. 28, and widths 14 in. and under	40c
All Nos. to No. 28, inclusive and widths over 14 to 2 (in. inclusive	43c
Over 20 in. to 30 in., inclusive	45c
Half-cent ₩ ℔ advance on each No. above No. 28 to 38, inclusive.	
All Brass thinner than No. 38 is Platers' Brass at	59c
Sheets 24x48 in., and all sheets cut to particular sizes and lengths	46c
Printers' Rules	50c
Sheets wider than 30 in. and under 40 in	50c
" 40 " and over	52c
Circular sheets, in diam. from 4 in. to 14 inclusive.	50c
Circular sheets, in diam. over 14 in. to 20 inclusive.	53c
Circular sheets, in diam. over 20 in. to 30 inclusive.	56c
Circula sheets, in diam. over 30 in. to 40 inclusive.	59c
ircular sheets, in diam. over 40 in	62c

LOW BRASS.

cents ₩ ℔ more than High Brass.

ilding Metals, 7c. ₩ ₩ more than High Brass.

aters' or Gold Metal { In Bars 52c / Sawed 55c

FOR SLITTING : Metal in Width,

2 in. to ½ in., to No. 30, inclusive, 1c. ₩ ℔ advance.
2 in. to 1 in., thinner than No. 30, 2c. ₩ ℔ advance.
1 in. to ½ thinner than No. 30, 3c. ₩ ℔ advance.
½ in. and less to No. 30, 2c. ₩ ℔ advance.
½ in. and less thinner than No. 30, 5c. ₩ ℔ advance.
10 ⅌ discount.

SCRAP.

High B Scrap, 21 cents, net.
Low 33 " "
Gilding, 25 cents, net.
Turnings, Filings and Chips, half the price of crap, net.

BRASS AND COPPER WIRE.

(Stub's Wire Gauge.)

	High Brass.	Low Brass.	Gild'g and Cop'r.
Nos. 0 to 20	43	47	53
Nos. 21, 22, 23	44	48	54
Nos. 24 and 25	45	49	55

Brass Wire straightened and cut, 4 cents advance, 10 ⅌ discount

FINE WIRE—NET PRICES.

	High Brass.	Low Brass.	Gil andd'g Cop'r.
No. 26	0·45	0·49	0·55
No. 27	0·48	0·52	0·58
No. 28	0·50	0·54	0·60
No. 29	0·52	0·56	0·62
No. 30	0·54	0·58	0·66
No. 31	0·56	0·60	0·70
No. 32	0·60	0·64	0·75
No. 33	0·64	0·68	0·85
No. 34	0·68	0·72	0·95
No. 35	0·73	0·77	1·07
No. 36	0·82	0·86	1·19
No. 37	1·02	1·02	1·32
No. 38	1·32	1·32	1·62

Ten cents per pound extra for Spooling.

TUBING

(Brown & Sharp's Gauge.)

	₩ ℔
Plain to No. 20, inclusive	$0·56
Nos. 21, 22, 23, 2c. advance on List for each No.	
Nos. 24, 25, 26, 4c. " " " "	
Above No. 26 special rates.	
Plain Tube, 1-4 inch	72
" " 3-16 "	1 57
" " 1-8 "	1 82

All Mandrel-Drawn Tubes 5c. advance on List.
Fancy Tubing 4c. advance on List above Plain.
English, Scotch, and Extra Patterns Fancy Tubing to No. 20 65
Tubing sawed or cut 2 to 4 ft. long, 2c. advance on List.
Add to two cents a half-cent for each additional cutting under two feet.
10½ discount.

BRASS DOOR RAIL, Polished.—32 cents per lb.—10 ⅌ discount.

BELT AND HOSE COPPER RIVETS AND BURS.

Price per ℔	57	58	60	62	64	66	68	72	76c.
Nos.	7	8	9	10	11	12	13	14	15

Braziers Rivets, 51 cents per pound.
Copper and Brass Rivets and Burs made to particular sizes and pattern.
The discount on the foregoing list will be 10 per cent.

GERMAN SILVER MARKET METAL AND WIRE.

	Market Metal.	Wire.
4 per cent. 12 inch. to No. 26	0·65	0·80
6 " " "	0·75	0·90
10 " " "	0·90	1·10
15 " " "	1·00	1·25
18 " " "	1·10	1·40
20 " " "	1·20	

German Silver Sheets over 12 inches wide and weighing more than 10 lbs. $2·60 ₩ ℔ the
Advance two cents for each additional inch in width above 12 inches, and two cents per pound on each No. thinner than Nos. 26 to 36, inclusive.
All German Silver thinner than No. 36 is Platers' at 50 cents per pound additiona..
German Silver Scrap, one-third less than net price of 12 inch Market Metal ; German Silver Turnings, Filings and Chips, half the price of Scrap.
*Brown & Sharp's Gauge is about two numbers finer than Stubs' Wire Guage.

COPPER—DUTY : Pig, Bar and Ingot, 5 ; old copper, 4 cents ₩ ℔ ; Manufactured (including all articles of which copper is a component of chief value), 45 ⅌ ad valorem. All subject to a reduction of 10 per cent.

American Ingot	₩ ℔	35½ @ 35c
English "	"	31 @ 32c

SHEATHING, BRAZIERS' COPPER, BOLTS, &C.

Braziers Copper, ordinary sizes, over 16 oz., per square foot	45c.	₩ ℔
Braziers' Copper, ordinary sizes, 16 oz. and over 12 oz., per square foot	48c.	"
Braziers' Copper, 12 oz. per square foot and lighter	51c.	"
Circles less than 84 inch in diameter	48c.	"
Circles, 84 inch diameter and over	51c.	"
Segment and Pattern Sheets	48c	"
Locomotive Fire Box Sheets	45c.	"
Sheathing Copper, over 12 oz. per sq. ft	43c.	"
" " 12 oz. ₩ sq. ft. & lighter	51c.	"
Bolt Copper	45c.	"

No Copper is Sheathing except 14x48 inches, and not to exceed 34 oz. to the square foot.

TINNING.

14x48, by the case	8c.	₩ sheet.
14x48, less than case	10c.	"
Boiler Sizes, 7 and 8 inch	12c.	"
" " 9 inch	15c.	"
Other sizes not larger than 30x60	2½c.	₩ sq. ft.
Larger than 30x60	5c.	" "
Copper Bottoms, 48c ₩ ℔.; 5 ⅌ discount.		

O'NEIL'S PATENT PLANISHED COPPER.

14x48.

14 and 16 oz. and heavier..49c. By the case, 48c. ₩ ℔
12 oz. and lighter.....52c. " " 51c. "

Boiler Sizes.

7 in., 14x52. 8 in., 14x56, 9 in., 14x60.
14 and 16 oz. and heavier..51c. By the case, 50c. ₩ ℔. (And all sizes not over 20 inches wide).

20x60.

14 and 16 oz. and heavier	53c.	₩ ℔.
12 oz	56c.	"

LEAD—DUTY : Pig, $2 per 100 lbs.; old Lead, 1¼ cent per lb.; Pipe and Sheet, 2¼ cents per lb. All subject to a reduction of 10 per cent.

Spanish	@ 6¾c gold
German Refined	@ 6¾c gold
English	@ 7¼c gold
Bar	dis 10 ⅌ 9¼c
Pipe	dis 10 ⅌ 10½c
Tin Lined Pipe	dis 10 ⅌ 16½c
Sheet	dis 10 ⅌ 10½c
Shot	dis 10 ⅌. Drop, 11¼c; Buck, 12¼c

STEEL—DUTY : Bars, Ingots, Sheets and Coils, valued at 7 cents per lb., or under, 2¼ cents ; over 7 cents, and not above 11, 3 cents per lb.; over 11, 3¼ cents per lb. and 10 ⅌ ad val. Railway Bars 1¼ cents per lb. Railway Bars, in part Steel, 1 cent per lb. All subject to a reduction of 10 per cent. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as Steel.

American Cast Steel.

Tool	17c
Spring	18½c
Homogeneous	13½c
Tire	12½ @ 13½c
Machinery (round and square)	11½ @ 12c
File	12½
Sheet	14 @ 16c
Saw Plate, mill and mulay	14 @ 16½c
aw Plate, gang and X cut	13 @ 14
circular as to size	18 @ 30c

Chrome Steel.

Tool	16@ 18c
Machinery	11 @12c
File	12 @ 15c

English Steel—payable in gold, dis. 5 ⅌ cash.

do	Best Cast	₩ ℔	19½c
do	Extra Cast	"	20½c
do	Round Machinery, Cast.	"	12½c
do	Swaged, Cast	"	21½c
do	Best Double Shear	"	19½c
do	Blister, 1st quality	"	15½c
do	do 2d quality	"	13½c
do	do 3d quality	"	11½c
German Steel, Best		"	12½c
do	Eagle	"	11½c
do	3d quality	"	10½c
Sheet Cast Steel, 1st quality		"	19½c
do do	2d quality	"	17½c

SPELTER—DUTY : In Pigs, Bars and Plates, $1 50 per 100 lbs.—less 10 per cent.

Silesian, cash	7 @ 7¼c. gold
American "	7 @ 11c currency

TIN—DUTY : Plates, Sheets, Tagger and Terne, 15 per cent. ad val. : Electro-galvanized Plates, 2 cents per lb. ; Manufacturers of, not enumerated, 35 per cent. ad val.—all subject to a reduction of 10 per cent. Bars, Banca or Block, and Pigs, free.

Banca	₩ ℔	37½c, gold
Straits	₩ ℔	@ 32c, gold
English	₩ ℔	@ 32c, gold

CHARCOAL TIN PLATE.

I C 10x14, Prime Charcoal	@ 13·00
12x12, "	@ 13·50
14x20, "	@ 14·00
I X 10x14,	@ 15·25
12x12, "	@ 15·75
14x20 "	@ 16 25
For each additional X add	2·25 @ 2·50

COKE TIN PLATE.

	Best.	2d Quality.	Ordinary.
I C 10x14	$12·00	$11·50	$11·00
14x20	12·50	12·00	
12x12	12·50	12·00	

TERNE PLATE.

	Prime Charcoal.	2d qual. Charcoal.	Coke.
I C 14x20	$11·50 @ 12·00	11·25 @ 11·75	10·50 @ 11·50
I X 14x20	13·50		

ZINC—DUTY : Pig or Block, $1 50 per 100 lbs. Sheet, 2½ cents per pound. All subject to a reduction of 10 per cent.

Sheet	cask 10
"	open 10½

Paper Stock, Old Metals, &c

(Dealers' Selling Prices.)

Canvas linen	5¾ @ 6
Canvas, cotton, No. 1	7⅜ @ 7⅝
" " No. 2	4
White linen rags, No. 1	6½ @ 7
" " No. 2	5 @ 5¾
Colored	3 @ 3½
Mixed woolens	2 @ 3
Soft woolens	2
Gunny bagging	2¾ @ 3
Jute Butts	1¾ @ 2
Kentucky bagging	3½ @ 3¾
Book stock	4¾
Waste paper and scraps	2½ @ 3
Rope cuttings	1½ @ 3
Kentucky Bale rope	4 @ 4¼
Oakum junk, No. 1	5 @ 5¾
" " No. 2	4
Grass rope	4¼ @ 4¾
Tarred Shaking	2 @ 2½

Old Metal.

Copper	27 @ 28
Yellow metal	18 @ 20
Brass	18 @ 21
Old lead, solid	6½ @ 7
Tea lead	5½
Wrought Iron	1½
Sheet iron	1 @ 1⅛
Cast iron	@ 1⅛
Machinery iron	1¼ @
Zinc	@ 5¼
Pewter, No. 1	26 @ 27
" No. 2	10 @ 12
Spelter	7

Paints, Oils, etc.

Paints.

Black, lamp—Coach Painters	₩ ℔ 20
" " Ordinary	6c
" Ivory Drop, fair	15c
" " best	26c
Black Paint, in oil	kegs, 8c, asst'd cans, 10¼c
Blue, Prussian, fair to best	50 @ 75c
" " " in oil	35 @ 65c
" Chinese, dry	33c
" Ultamarine	25 @ 30c
Brown, Spanish	1¾c
" Van Dyke	.c
Carmine, French	$14 00
Green, Chrome	15 @ 25c
" " in oil	18 @ 25c
" Paris	good, 30c, best, 40c
" " in oil	" 30c, " 45c
Mineral Paints	1¼ to 4c
Orange Mineral	14¾c
Red Lead, American	9¾c
" " English	10¾c
" Venetian (N. C.) dry	3½c
" " in oil	asst'd cans, 11c, kegs, 8½c
" Indian, dry	10c
Rose Pink	13c
Sienna, American, Raw	4c
" Burnt	4½c
" " in oil	16 @ 26c
" Raw "	15 @ 25c
Umber, Burnt	4 @ 8c
" " in oil	16 @ 21c
" Raw	3½ @ 7¾c
" " in oil	16 @ 22c
Vermillion, Chinese	1 40
" English	1 30
" Trieste	1 05
" American, Common	23c
White Lead, American, pure dry	10¾c
" " " in oil	11¾c
White, Paris, English, prime	in bbls. 2¼ @ 2¾c
Yellow Ochre, French	2¼ @ 2¾c
" " " in oil asst'd cans, 11c, kegs, 8½c	
" " Vermont	in casks 1¾c
" Chrome	17 @ 27c
" " in oil	15 @ 28c
Zinc White, American No. 1 dry scarce	10c
" " " 1, in oil	12c
" French (Paris)	11¾c
" " in oil	12¾c

Oils.

Linseed Raw	₩ gal. casks, 95c, bbls, 96c
" Boiled	" 1·00c, " 1·01
Whale, Crude	"
" Bleached Winter	"
Sperm, Crude	"
" Winter unbleached	"
" Bleached	" 1 85
Seal, Extra Refined	" 87½c
Lard, Pure Winter	" 80c
" Spring	" 78c
Cotton Seed, Crude	" 55c
" Southern Yellow	" 65c
" White	" 75c
Neatsfoot, Winter	" $1 35
Natural Lubricating	" 45c

Sundries.

Asphaltum	6c
Benzine	₩ gal. 30c
Chalk	1½c
" Block	
Dryer, Patent, Am'n	asst'd cans, 11½c., kegs, 9c
" English	" " 12c., " 11c
Flocks	
Frostings	50c
Glue, White	33 @ 45c
" Sheet	20c
Glazier's Points, Zinc	9c
Gum, Copal	35c
" Damar	25c
" Shellac, English	50c
" " " dark	46c
Litharge	10c
Pumice Stone, selected Lumps	5 @ 7c
" " powdered	4c
Putty in bladders	3½c
" in bulk	3c
Rotton Stone, soft, English	5c
Sand Paper, crystal	$3 25
" " flint	4 50
Spirits Turpentine	66c
Whiting, Spanish	1¼c

Glass.

French Window—1st, 2d, 3d, and 4th qualities. Per box of 50 feet.

SINGLE.

SIZES.	I.	II.	III.	IV.
6 x 8 to 7 x 9	$8·00	$7·00	$6·50	$6·00
8 x 10 to 10 x 14	9·00	8·00	7·25	6·50
10 x 15 to 12 x 16	9·75	8·75	7·75	7·00
11 x 18 to 16 x 22	10·25	9·25	8·25	7·50
15 x 24 to 15 x 32	12·50	11·50	10·50	8·50
20 x 28 to 22 x 30	15·00	13·00	11·00	9·00
26 x 28 to 22 x 36	16·00	14·50	12·50	
24 x 36 to 24 x 40	18·00	16·00	13·50	
28 x 38 to 26 x 44	18·50	16·50	14·00	
28 x 44 to 30 x 48	20·50	18·00	15·00	
30 x 50 to 32 x 52	22·00	20·00	16·00	
32 x 54 to 32 x 58	26·00	23·00	18·50	
34 x 58 to 34 x 60	30·00	27·00	22·50	
36 x 60 to 40 x 60	36·00	33·00	28·50	

DOUBLE.

SIZES.	I.	II.	III.	IV.
6 x 8 to 7 x 9	$12·00	$11·50	$10·00	$9·50
8 x 10 to 10 x 14	13·50	12·00	11·00	10·00
10 x 15 to 12 x 16	15·00	14·00	12·50	11·00
11 x 18 to 16 x 22	16·50	15·50	14·00	12·00
15 x 24 to 15 x 32	20·00	18·00	17·00	
20 x 28 to 22 x 30	24·00	22·00	18·50	
26 x 28 to 22 x 36	26·50	24·00	22·00	
24 x 36 to 24 x 40	30·00	27·00	23·50	
28 x 38 to 26 x 44	32·00	28·50	25·50	
28 x 44 to 30 x 48	34·50	31·00	27·00	
30 x 50 to 32 x 52	36·50	33·00	28·50	
32 x 54 to 32 x 58	43·00	39·00	34·00	
34 x 58 to 34 x 60	50·00	45·00	40·00	
36 x 60 to 40 x 60	60·00	55·00	50·00	

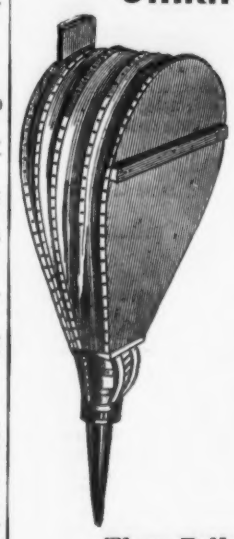
Discount 40 & 10 ⅌.

GEORGE E. NEWCOMB. JAMES W. NEWCOMB. JOHN H. NEWCOMB.

NEWCOMB BRO'S SONS,

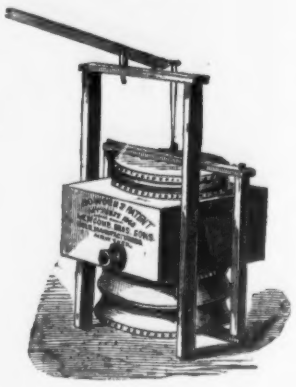
Manufacturers of

Smiths', Moulders' and Hand



Also the Sole Manufacturers of

Bowden's Patent TRIPLE-ACTION Forge Bellows.



These Bellows are superior to all others now in use.

They can be used either in single or double-action, for light or heavy work, as required. They maintain a steady and continuous blast, the air being forced into the chest both at the up and down stroke. The strength of blast obtained is double that of the ordinary bellows of the same dimensions. They work easily. While the blast is double, the power required to work them is no more than that of a common bellows. Being fully rigged and geared, ready for work, and easily moved from place to place, they are very convenient or rail road, mining, and other purposes where portable bellows are required. They economize space, occupying only half the room of an ordinary bellows. These Bellows come to hand at once. A good b ast is obtained at the first stroke, and no time or labor is lost, as in the old single-action bellows, in gettiag up a good blast. They can be made of any size and shape, to suit all requirements. They are the cheapest Bellows in the world. With all the advantages of double-action, they cost no more, power for power, than the common single-action of same quality. For further particulars send for descriptive circular and price list.

586 Water St., near Montgomery, N. Y.

STATE RIGHTS FOR SALE.

Canal Street, East Broadway and South Street Cars cross Montgomery Street.

THE CORRUGATED STOVE PIPE ELBOW,

Strong, Cheap.

Durable. No Soot, Better Draft.

MANUFACTURED BY

SELLEW ELBOW CO.,

48 Cliff Street, NEW YORK. 27 North Canal Street. CHICAGO.

HARTFORD STEAM BOILER INSPECTION AND INSURANCE CO.

CAPITAL, - - $500,000.

Issues Policies of Insurance, after a careful Inspection of the Boilers

COVERING ALL LOSS OR DAMAGE TO

Boilers, Buildings and Machinery,

ARISING FROM

STEAM BOILER EXPLOSIONS.

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Full information concerning the plan of the Company's operations can be obtained at the

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or at any Agency.

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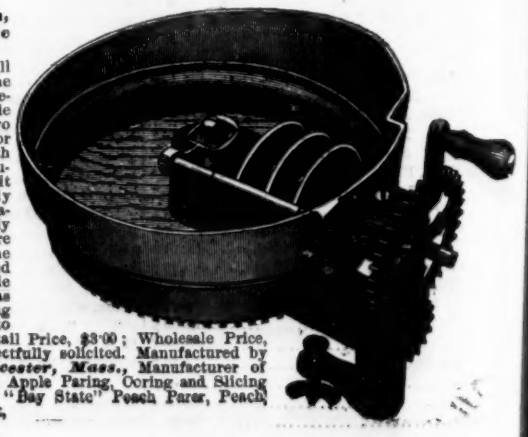
D. H. Whittemore's Hash, Mince Pie Meat and Sausage Meat Cutter.

Also, cuts Vegetables, &c. It will cut hash, including potato, in one minute, saving much time in preparing meals. It will cut mince pie meat and sausage meat in from two to three minutes, and with less labor than in chopping the same time with a common knife! While it is superior as a sausage meat cutter, it is much more valuable to the family for cutting boiled meat and vegetables, because much more frequently brought into use, yet costs no more than "Sausage" Meat Cutters. The meat in the Machine is simply rolled under the knives, so that but little power is required. The machine has been thoroughly tested, is meeting with a ready sale, and is warranted to be all that it is represented. Retail Price, $3·00 ; Wholesale Price, $27·00 per doz. Orders are respectfully solicited. Manufactured by *D. H. WHITTEMORE, Worcester, Mass.*, Manufacturer of the "Bay State" and "Skeleton" Apple Paring, Coring and Slicing Machines, "Union" Apple Parer, "Bay State" Peach Parer, Peach Stoner and Halver, Nut Cracker, &c,



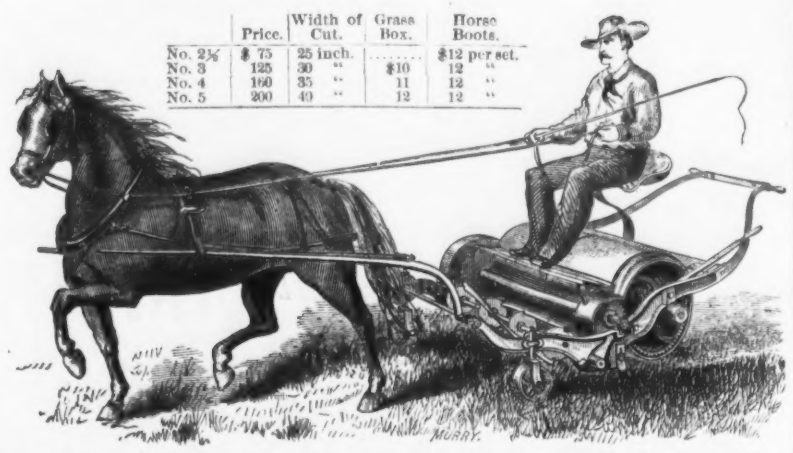
THE IMPROVED
EXCELSIOR LAWN MOWERS,
FOR HAND OR HORSE POWER.

MANUFACTURED BY

CHADBORN & COLDWELL MAN'FG. CO.

P. O. Box 479, NEWBURGH, N. Y.

	Price.	Width of Cut.	Grass Box.	Horse Boots.
No. 2½	$ 75	25 inch.	.....	$12 per set.
No. 3	125	30 "	$10	12 "
No. 4	160	35 "	11	12 "
No. 5	200	40 "	12	12 "



No. 0 Mower—Cuts 11 inches—Price, $16.
No. 1 " — " 14 " — " $25.
No. 2 " — " 18 " — " $30.
The No. 1 for general use, and warranted.
The No. 2 for large lawns—when smooth.

The Excelsior is simple and durable. The *gearing* securely incased and will not clog. Has a *full roller*, without which no machine is perfect. A *ball ratchet*—"noiseless"—needs no oiling. Adjustable *wrought iron handle*. *Hangers* secured by bolts. The front rollers to these are adjustable, to vary the hight of cut. *Open balance wiper*—with *steel knives*—the only practicable means of securing strength and ease of draft. *Patent iron handle*, with attachment on each side of the machine—avoids the serious annoyance of a single wooden handle. The **Excelsior Lawn Mower** having been before the public for four years, and subjected to the most severe tests, the manufacturers feel warranted in asserting that for SUPERIORITY in *simplicity of construction* and *durability* it has no equal. It is *important* in either *Horse* or *Hand Lawn Mowers*, that their design should combine the *greatest strength* with least amount of *metal*; we therefore use only the very *best material*, together with *good workmanship*, enabling us to produce *Lawn Mowers* light *in weight*, of *easy draught*, and at a price within the reach of all.

The Excelsior has received the most favorable commendation from all, and the advantages claimed for it over other machines are fully appreciated wherever it is known. To this we add numerous testimonials, but the fact that our sales have greatly increased year by year, is the most convincing proof of its adaptation to the wants of the public.

Grand Silver Medals Awarded the Excelsiors at the

New England Fair, held at Lowell, Mass., Sept., 1871 and 1872; New Jersey State Fair, held at Waverly, N. J., Sept., 1871 and 1872; the first premium at the New York State Fair, 1871; Western New York Fair, 1871; Ohio State Fair, 1871 and 1872; Northern Ohio Fair, 1871 and 1872; Michigan State Fair, 1871 and 1872; Indiana State Fair, 1871; Wisconsin State Fair, 1871 and 1872, Tennessee State Fair, 1871; Virginia State Fair, 1871; South Carolina State Fair, 1871.

For description of Mowers, and particulars, send for catalogue. Agents wanted. A liberal discount to the trade.

BUY SWAIN TURBINE WATER-WHEEL.

WHY?

THEY GIVE THE BEST RESULTS, BOTH AT FULL AND PARTIAL GATE, OF ANY WHEEL IN USE, AS SHOWN BY THE RESULT OF THE TESTS MADE BY MESSRS. JAS. B. FRANCIS, HYDRAULIC ENGINEER FOR THE LOWELL COMPANIES, AND HIRAM F. MILLS, HYDRAULIC ENGINEER FOR THE LAWRENCE COMPANIES.

Illustrated Catalogues, Reports of Tests and Circulars sent on application.

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THE SWAIN TURBINE COMPANY,
Lowell, Mass.

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SEND TO THE

NEW YORK ENAMEL PAINT COMPANY. TRADE MARK.

FOR SAMPLE CARDS.
White Lead, Zinc and Linseed Oil
Chemically Combined.
A Great Improvement!!!
Beautiful, Economical & Durable.
White, Black, and over 100 different shades.
Mixed ready for use and sold by the gallon only.
Office, No. 43 Chambers Street, N. Y.
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JAMES H. DAVIDSON, Secy.

BADGER MACHINE WORKS
FOR SALE.

In order to close an estate, the subscriber offers for sale the entire works conducted by the late A. M. BADGER.

For particulars inquire of

S. A. BADGER, Admi'x.

Nos. 4 & 6 Hill Street, ROCHESTER, NEW YORK.

October 16, 1871.

MAYER'S BOILER COMPOUND for the Removal and Prevention of Scale and Sediment from Steam Boilers.

It is entirely free from acids; for efficiency it is the cheapest invented. ***Price, 25 cents a pound.*** Parties trying this compound and finding it other than represented are freed from any cost. All I ask is a fair trial, and insure satisfaction. I will send to any party as many pounds as they need for trial, and ask payment only after they are satisfied. 1-3 of a pound for each horse power for first trial; after, 1-8 of a pound every two weeks. Send your orders to

I. MAYER, Manufacturer, 99 Mercer St., N. Y.

LEONARD & SILLIMAN

MANUFACTURERS OF

Portable Grist Mills,

BURR MILL STONES, &c.

BURR STONES, Strong Iron Frame.

BRIDGEPORT, CONN.

Capron's Improved Turbine
WATER-WHEEL.
POLISHED & DETACHABLE BUCKETS
CHEAPEST & BEST WHEEL MADE.
CAPRON WATER WHEEL CO. HUDSON, N.Y.

ERIE RAILWAY.

WINTER ARRANGEMENT of Trains taking effect Nov. 4th, 1872. From Chambers St. Depot. (For 23d St. see note below).

9·00 A. M. Cincinnati and Chicago Day Express. Drawing Room Coaches to Buffalo and Niagara Falls, and Sleeping Coaches to destination.

11·00 A. M. Express Mail for Buffalo and Niagara Falls. Drawing Room Coach to Susquehanna and Sleeping Coaches to destination.

5·30 P. M. Night Express. Sleeping Coaches to Buffalo and Niagara Falls.

7·00 P. M. (Daily) Cincinnati and Chicago Night Express. Sleeping Coaches through to Cincinnati, Buffalo, Niagara Falls, and thence to Chicago.

Additional Trains leave for

Newark, 6·30, *8·45 and 11·30 A. M., and 3·15, 5·15 and *6·30 P. M.

For Port Jervis, 8·00, 9·00, 11·00 and *11·15 A. M., 4·30, 5·30, †6·30 and *7·00 P. M.

For Goshen and Middletown, *7·30, 8·00, †8·30, 11·00 and *11·15 A. M., 3·30, 4·30, 5·30, †6·30 and *‡7·00 P. M.

For Warwick, 8·00, 11·00 and *11·15 A. M., 4·30 P. M.

For Newburgh, 8·00, †8·30, 9·00 and 11·00 A. M., 3·30, 4·30 and 5·30 P. M.

For Suffern, †7·30, 8·00, †8·30, 11·00 and *11·15 A. M., 3·30, 5·00, †6·30, 7·00 and *11·30 P. M.

For Ridgewood, Hohokus, Allendale, and Ramsey's, †7·30, 8·00, †8·30, 11·00, *11·15 A. M., 3·30, 5·00, 6·00, †6·30, 7·00 and *11·30 P. M.

For Paterson, 6·45, *7·30, 8·00, †8·30, 10·00, 11·00, *11·15 A. M., 12·00 M., *1·45, 3·30, 4·00, 5·00, 5·15, 5·30, 6·00, *6·30, *7·00, 8·00, 10·00 and *11·30 P. M.

For Rutherford Park and Passaic, 6·45, *7·30, †8·30, 10·00, 11·00 A. M., 12·00 M., *1·45, 3·30, 4·00, 5·15, 6·00, *6·30, 8·00 10·00 and *11·30 P. M.

For Hackensack and Way 5·00 8·15 and †8·45 A. M., 1·00, 4·00, 5·00, 6·00 and 6·30 P. M., and Saturdays only, 12·00 midnight.

For Hillsdale and Way, 5·00, 8·15 and †8·45 A. M., 1·00, 4·00, 5·00 and 6·00 P. M., and Saturdays only, 12·00 midnight.

For Spring Valley and Way, 5·00, 8·15 †8·45, and ·00 A. M., 1·00 4·47, 5·00 and 6·00 P. M., Saturdays only 12·00 midnight.

For Englewood 5·00, 7·45, *9·00, A. M., 1·30, 3·15 4·15, 4·45, 5·30, 6·30 and *7·45 P. M. Saturdays only, 12·00 midnight.

For Cresskill, 5·00, 7·45, *9·00 A. M., 1·30, 3·15, 4·15, 5·30, 6·30 and *7·45 P. M. Saturdays only, 12·00 midnight.

For Upper Piermont, 5·00, 7·45, *9·00, A. M., 1·30, 4·15, 4·45, 5·30, 6·30 and †7·45 P. M. Saturdays only, 12·00 midnight.

For Piermont and Nyack, 7·45 and *9·00 A. M., 1·30, 4·45, §5·30, 6·30 and †7·45 P. M. Saturdays only 12·00 midnight.

N. B.—Trains leaving Chambers street on even hours or half hours leave 23d street fifteen minutes earlier than above time. The 5·00 A. M., 10·00 and 11·30 P. M. Trains start from Chambers Street only.

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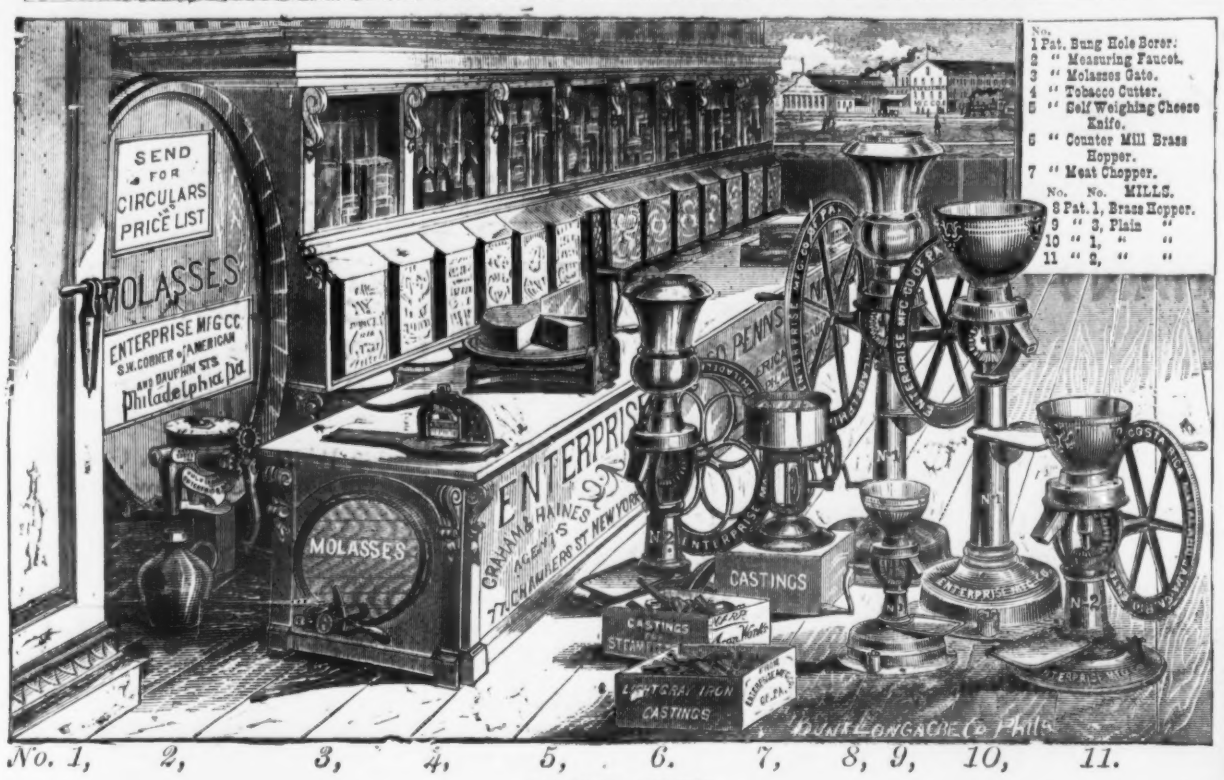
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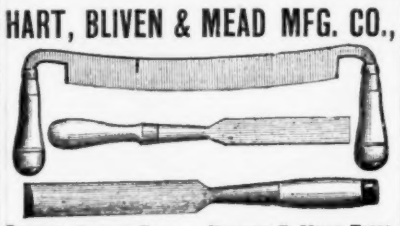

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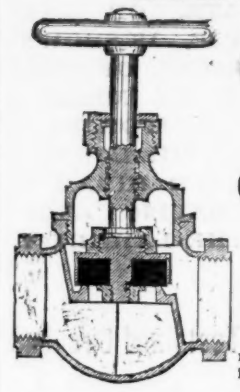

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Solid Cast Steel.....₽ lb 12½c
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Union.....per doz 8 00

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Cast " " .....dis 35%

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" " Broad.....dis 30%
Cast Loose Joint.....dis 40%
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Wrought Table.....net
" Narrow.....list net
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Clark's " " .....dis 30%
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Galvanized Pump.....₽ lb 15c
English Coil, less than cask.....add ½c. ₽ lb
Common Chain.....½c. ₽ lb less.
Best Proof Coil Chain—

₽ lb....	14⅛	11¾	10½	10	9¾	9½	9c gold
	3-16	¼	5-16	⅜	7-16	½	⅝ in.

By the cask, 500 lbs., discount ¼c per lb. Common Chain, ½c per lb. less than proof.

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	Nos.	6	7	8	9	10
Ausable Horse Nails		27	25	24	23	22
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Half Weight Tacks.....dis 70%
" " by case.....dis 70&7½%
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Tafts Wrought Bar.....60%
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No. 0 to 18.....dis 20%
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9-16.	19	5	10
5-8.	25	6	9½
11-16.	30	8	9⅓
¾	35	10	8¾
13-16.	40	12	8⅝
⅞	47	14	8⅝
15-16.	54	16	8⅝
1.	60	18	8⅛
1 1-16.	67	20	8⅛
1⅛	74	23	8
1 3-16.	83	26	7⅞
1¼	90	28	7¾

All larger sizes same price as 1¼ inch.
Stud Chain 2½c. less than same size close link.

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From the Pittsburgh Commercial.

FLAT BAR.

1¾ to 4 by ¾ to 1 inch.....4·6c
4¼ to 6 by ⅜ to 1 inch.....4·8c
1¾ to 6 by 1⅛ to 1½ inch.....5·0c
1¾ and 1¾ by ¾ to ¾ inch.....4·8c
1 and 1⅛ by ⅜ to ¾ inch.....4·9c
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HORSE SHOE.

All sizes.....6·1c
Nail rods.....8 5c

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3½ to 6 by ¼ and 5-16 inch.....5·2c
1½ to 3½ by ⅜ and 5-16 inch.....5·3c
⅞ to 1⅜ by ¼ and 5-16 inch.....5·6c
⅜ to ¾ by ¼ and 5-16 inch.....5·8c

LIGHT BANDS.

3 to 6 by 3-16 to No. 12.....5·6c
1½ to 2¾ by 3-16 to No. 12.....5·8c
1 to 1½ by 3-16 to No. 12.....6 2c
⅜ to ⅞ by 3-16 to No. 12.....6·8c

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2¼ to 3 inch.....5·9c
3½ to 4¾ inch.....6·1c
1¾ to 2 inch.....6·1c
1¾ to 1 11-16 inch.....6·4c
1½ and 1⅝ inch.....6·7c
1 inch.....7·1c
⅞ inch.....7·6c
¾ inch.....8·1c
⅝ inch.....8·6c
½ inch.....9·1c

ROUND AND SQUARE.

1 to 1⅞ inch.....4·6c
2 to 2¾ inch.....4·9c
3 to 3¾ inch.....5·1c
3¾ to 4 inch.....5·6c
⅞ to 9-16 inch.....5·0c
⅝ to 7-16 inch.....5·3c
⅜ inch.....5·4c
5-16 inch.....5·8c
¼ inch.....6·2c
3-16 inch.....8·2c

OVAL IRON.

⅞ to 1¼ inch.....5·2c
⅝ to ¾ inch.....5·4c
½ inch.....5·6c
⅜ inch.....6·2c

HALF OVAL AND HALF ROUND.

⅞ to 1¼ inch.....5·5c
⅝ to ¾ inch.....6·0c
½ inch.....6·7c
⅜ inch.....8·2c

Sheet Iron,	Boiled.	Charc'l.	Juniata.
10 to 14	6·2	7·7	9·2
" 15 to 20	6·4	7·9	9·4
" 21 to 24	6·6	8·1	9·6
" 25 to 26	6·8	8·3	9·8
" 27	7·0	8·5	10·0

All sheets over 28 in. wide, ¼c. ₽ lb extra.

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3-16, ¼ and ⅝ inches thick.....6·0
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1¼ by ¾, 7-16 and ½ inch.....5·6
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1¾, 1¾ and 2 by ½ and ⅝ inch.....5·1
1⅜ by ⅝ inch.....5·3

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Flat bars and rounds and squares.....1c
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Hoops.....5cc

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Note or acceptance at sixty days, with currant rate of exchange on New York, or a discount of 2 per cent. for cash, if remitted within fifteen days of date of invoice. Payment to be made in New Bork exchange, United States Treasury notes, or their equivalent. No discount on bills of less than $50.

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The following are the card rates of Lewis, Oliver & Phillips:

Iron, standard list, assorted sizes, for large orders, 4·6c, card rate, 2% off net.
Iron wedges.....7½c ₽ lb net
Norway Nail rods.....9¼c ₽ lb net
Fence Pickets—
¾ round, bent to shape.....40c ₽ ft. fence, less 10% Discount off Standard List.
Carriage and tire bolts.....60% off net
Plow blots.....15% off net
Stove bolts.....list net
Machine and square head bolts new list.....15% off net
Coach and lag screws, new list.....15% off net
Bolt Ends, new list.....15% off net
Square and hexagon nuts and washers, new list.....2¾c ₽ lb off net
Washers.....new list, 4c ₽ lb off
1c. ₽ lb extra for less than 1 keg of each size.
Harrow teeth, in lots of 1 ton or more, 1 in. diam 6c; ¾ & ⅞ in. diam. 6c; ⅝ in. diam. 6¼c ₽ lb.
Patent Headed Harrow Teeth, packed in casks ½c extra ₽ lb net.
Skein bolts, in bulk, in lots of 1 keg or more, ⅝ in. diam. 9¼c; 9-16 in. diam. 10½c; ½ in. diam. 11½c. 1c. ₽ lb extra when less than 1 keg of each size is ordered.
Screw Hook-and-Eye Hinge, ¾ to 1in. diam. 10½c; ⅝ in. diam. 11½c; ¾ in. diam. 13¾c ₽ lb, net.
Screw and Strap Hinges, in lots of 50 pairs or more, 14 to 36 in. long, 8c; 8, 10 and 12 in. long, 9½c ₽ lb net.
Strap and T Hinges.....net list
6 months purchases over $1000, 5% dis. allowed.
Screw hitching rings.....$7 50 ₽ 100 net
Duck nest tuyere irons.....$17 00 ₽ doz. net
Cast iron washers.....5¼c ₽ lb net
Bridge and Roof Bolts—
1 to 2 in. diam. over 8 feet long.....₽ lb 6c
1 to 2 in. diam. from 4 to 8 feet long.....6½c
1 to 2 in. diam., from 1½ to 4 feet long.....7c
⅝, ¾ and ⅞ in diam., over 4 feet long.....7¼c
⅝, ¾ & ⅞ in diam., from 1½ to 4 feet long 7¾c

WAGON HARDWARE.

Wagon Box Strap Bolts—
10 in. long by 7-16 at screw end, ₽ set of 8 bolts...55c
12 " ½ " ₽ " 8 " ...70c
12 " ⅝ " ₽ " 8 " $1 00
14 " ½ " ₽ " 8 " 1 10
16 " ⅝ " ₽ " 8 " 1 20
5 cts. ₽ set for each additional inch over 14 inch. by ½. All lengths made.
Wagon Box Rods, narrow track each.....18c
Wagon Box Rods, wide track, each.....20c
Single Tree Irons, per set of four pieces.....38c
Wt. Iron Bolster Plates, 2¾ in. wide, per set:.....60c
" " 3 " " 65c
" " 3¼ " " 70c
" " 3½ " " 75c
Wagon Brake Ratchets.....16½c each
" " " finished with guard 45c each
Wrought rub irons.....11c each
Wrought Hammer Straps, heavy pattern..16c each
" " light pattern..13½c each
Stay Chain Hooks.....8c each
Single Tree or End Clips.....each 9c
Double or Center Clips, light.....each 10c
" " " heavy.....each 12c
Strap Bolts, Rods, Single Tree Irons, Bolster Plates, Brake Ratchets, Hammer Straps, Rub Irons, Stay Chain Hooks and Clips, in lots of 50 set...15% dis.
Wagon Box Staples, 1½ to 2¾ in. to clinch per 1000, $16 50 net
Wagon Box Staples, Box Iron, to rivet on, per 1000, $11 50 net
Neck Yoke Eyes, each.....5½c net
Neck Yoke Eyes, with ⅜ inch rings.....8¼c net
King Bolts, ⅞, 1, 1⅛, and 1¼ in. diam. ₽ lb.....6c
Wagon Rivets, ex. large, oval and steeple head, ¼ in. diam., all lengths, ₽ lb.....11½c
Wagon Rivet, 3-16 inch diam., all lengths.....12½c
Wagon Rivets & nails in 5 lb paper boxes, ₽ lb ex 1c
Wagon and Hinge Nails, ₽ lb net.....17½c
Coupling Plates.....
Double Tree Plates.....10c ₽ lb net
Tongue Plates.....
Neck Yoke Plates.....₽ lb 13c
Tongue Cap Iron, 1¾, 2 and 2¼ in. wide, same price ₽ lb as Band Iron.
Wagon Chains, Stay Lock and Tongue 5-16 in., 13½c; ¼ in., 14½c.

Nails, Brads, Spikes, etc.

CUT NAIL LIST.

10d to 60d nails, fence, and brads.....$5 50
8d and 9d nails, fence and brads.....5 75
6d and 7d nails, fence and brads.....6 00
4d and 5d nails, fence and brads.....6 25
3d nails, fence and brads.....7 00
2d nails, fence and brads.....8 25

TOBACCO.

FINE BLUED.		BARREL.	
3d	$8 25	1¼ inch	$6 25
2d	9 25	1½ inch	6 50
LINING.		1¾ inch	7 00
7-8	10 00	1½ inch	7 25
CASING.		1 inch	8 00
10d to 50d	6 25	⅞ inch	8 50
8d	6 50	FINISHING.	
6d	6 75	10d to 50d	6 75
4d	7 00	8d	7 00
		6d	7 25
		4d	7 50

Cut spikes, all sizes.....5 75
Cut boat spikes.....6 25
Clinch nails, all sizes.....6 25

TERMS.—Sixty day's time, or two per cent. discount if remitted within ten days from date of invoice. Prices subject to changes in market without further notice.

LENGTH OF NAILS.

2d, 1 inch; 3d, 1¼ inch; 4d, 1½ inch; 5d, 1¾ inch; 6d, 2 inch; 7d, 2¼ inch; 8d, 2½ inch; 9d, 2¾ inch; 10d, 3 inch; 12d, 3¼ inch; 16d, 3½ inch; 20d, 4 inch; 30d, 4½ inch; 40d, 5 inch; 50d, 5½ inch; 60d, 6 inch.

BOSTON.

Corrected by Fuller, Dana & Fay, 110 North St., Boston, Importers and Commission Merchants.

Tin Plates.

I. C. Charcoal.....per box @ 13 00
" Coke.....@ 12 00
" Terne.....@ 12 00

Metals.

Pig Tin, Banca, gold.....per lb. 37½c
" Straits, " 31½c
" English, " 31½c
Copper, Sheathing.....43c
" " yellow.....38c
Copper Bolt.....45c
" Braziers.....45c
" Ingot.....37c
" Old.....
Lead, Spanish Pig, gold.....6¾c
" Sheet and Pipe.....9·45c
" Old.....6¾c
Spelter, Silesian, gold.....7¼c
" American, " 6¾c
Zinc, Sheet.....10¾c

Iron.

Sheet Iron, Russia, gold.....per lb. 18c
" English.....7c @ 7½c
" American.....8c
" Galvanized.....11c @ 13c
Swedes Bar Iron, Flat, gold.per ton, $140 00 @ $150 00
" Shoe Shapes, " " 155 00 @
Norway Bar Iron, Flats, " " 140 00 @ 150 00
Norway Shapes, gold, per ton, 155 00 @
Norway R'd, 2 in. to ¾ in. gld.pr.ton 145 00 @
" " 11-16 to ⅝ in. " " 162 50 @
" " 5-16 to ¼ in. " " 165 00 @
" Nail Rods, Roll'd " " 177 50 @
" " U B. " " 172 50 @
" " Benzon " " 167 50 @
" " Vasa, " " 162 50 @
" " N I W " " 157 50 @
English Refined Bar Iron, " " 100 00 @
Scotch Pig Iron, " " 55 00 @ 58 00
American " " 45 00 @ 52 00
Wrought Scrap Iron, " " 52 50 @ 55 00

Steel.

English Tool Steel, gold.....per lb. 16c.
" Machinery Steel, gold.....10c.
American Tool " .....16c.
" Machinery " .....11c.
Bessemer Steel.....8½ @ 9½c
German " .....per lb. 10½c.
Spring Steel.....9c.
Tire " .....8c.
Sleigh Shoe Steel.....6¾c.
Toe Calk " .....8¾c.

BUFFALO.

Reported by Messrs. Sidney Shepard & Co.

Jan. 2d, 1873.

Axes, Chopping—Blood's.....$13 50 @ 14 50
Augers—C. S. cut.....dis 3 %
Bits, Auger—Pierce's.....25%
Jennings'.....dis 10%
Bells, Cow—Yaw's Genuine.....net
Bells, Hand.....dis 50 @ 50&10%
Bellows—Smiths'.....dis 15 @ 20%
Moulders'.....dis 10%
Bolts—Carriage and Tire, dia. neck.....dis 60 & 10%
Braces, Bit—Barber's.....dis 30 & 10%
Spofford's Patent.....dis 37½%
Brads, Cut.....dis 50 @ 50&7½%
Boards—Stove, Brooks' Patent, new list.....dis 30%
Buckets—Well.....per doz $6 00
Butts—Brass.....dis 25%
Cast Loose Joint.....dis 40%
" " Pin.....dis 30%
" " " Japanned.....dis 30%
" " " Silver Tipped.....dis 20%
Wrought Narrow.....net
" Broad, Loose Joint.....dis 15%
" Table and Back Flaps.....net
Belting—Rubber.....dis 30 @ 33⅓%
Leather, new list.....dis 30 @ 30 & 5%
Beaters, Egg, "Peerless".....per doz $4 00
Brick—Bath (box of 2 doz) Best English.....$1·50
"Rutherford".....$1 25
Bung Borers—"Enterprise".....dis 20%
Chalk—White, Carpenter's.....per gross, 50c
Blue, Carpenter's....." " 85c
Crayon School....." " 14c
Chisels—Firmer Socket.....dis 60 @ 60 & 5%
Framing Socket.....dis 60 @ 60 & 5%
Corner Socket.....dis 60 @ 60 & 5%
Slick's Carpenters'.....dis 60 @ 60 & 5%
Castings—Malleable.....₽ lb, 11c
Cutters, Meat—Hale's Patent.....dis 10%
Cherry Seeders.....per doz $9 00

Elbows—Corrugated	5	5½	6	7	
Charcoal	$4·25	5·25	5·25	6·50	dis 10%
Russia	10·00	13·00	13·00	14·00	

Faucets—Wood, Cork Lined.....dis 50 @ 50&10%
Files—Wheeler, Madden & Clemson's.....dis 42½%
Freezers, Ice Cream—"Champion".....dis 33⅓%
Gates—Molasses—
Patent Self-Measuring.....₽ doz. $42 00; dis 20%
Hinges—Window Blind.....dis 30%
"Standard" "Shepard's".....dis 30%
Wrought Strap and T.....list net
Hods, Coal—Plain, Black and Galvanized.new list net
Funnel, Black and Galvanized.....new list net
Fancy and Helmet.....new list net
Hammers—Maydole's.....net
Yerkes & Plumb's.....dis 5 @ 10%
Hatchets—Blood's.....net @ 5%
Hooks and Staples—Wrought.....50&10 @ 60%
Hooks—Belt.....dis 45&10%
Hasps and Staples—Wrought.....dis 50&10%
Sad Irons.....₽ lb 5½c
Kettles—Brass.....₽ lb, 53½c
Enameled.....dis 30%
Knives, Drawing—Oval No. 1.....dis 60 @ 60 & 5
Razor Blade.....dis 37½ & 20%
Lanterns "Peerless".No. 1 3 10
₽ doz $26 00 $12 50 $15 00 dis 10%
"Radiant" ₽ doz 75 100 150 175 $13·13 13·13 22·50 22·50 dis 20%
Knobs—Door, R. & E. Mfg Co.....dis 20 @ 25%
Locks—Door, R. & E Mfg. Co.....dis 20 @ 25%
Machines—Apple Paring, Turn Table.. " " Lightning... $8·50 ₽ doz
Tinmen's.....
Doweling, Merchant's, No. 1.....4 75
" " No. 2.....5 00
Mills, Coffee—Box and Slide, common.....dis 10%
Box Union and Eagle.....dis 5%
Swift's Patent.....dis 10%
"Champion".....dis 20%
Nails—Cut, Chesapeake.....$5 00 rates
Clout and Finishing.....list @ dis 7½%
Shoe.....list @ dis 7½%
Horse, Ausable.....No. 5 6 7 8 9 10
30 27 25 24 23 22c
" " 1000 lbs.....dis 5%
" Clinton.....No. 6 7 8 9 10
23 21 20 19 18c
Packing—Rubber.....dis 30 @ 33⅓%
Pencils, Slate—Soapstone.....4 5 6 in.
30 40 50c. per 100
Case lots.....dis 20%
Paint—White Lead, U. S. Gov't.....₽ lb 9½c
Rivets—Iron, Black and Tinned.....dis 20 @ 25%
Copper.....5 @ 10%
Rope—Manila, ¾ inch and larger.....₽ lb 18c
Rules—Boxwood and Ivory.....dis 40&10%
Staples—Blind, Boardman's Pat., ⅜ & ½.....₽ lb 37c
Skates—White's.....dis 20%
Straps, Skate—Russet and Black.....net @ 20%
Spoons—Iron Tinned.....dis 10%
" " by the case.....dis 20%
Plated Rogers' A No. 1.....dis 25&5%
Squares—Steel and Iron.....list net
Shoes, Horse—H. Burden & Sons.....₽ keg $7 00
Shovels & Spades—Shepard, Forsyth & Dennison.....net
Saws—Henry Disston & Sons.....dis 5%
Scales—Buffalo Scale Works.....dis 25%
Fairbanks.....dis 15%
Screws—National Screw Co. Iron, Brass.....dis 40%
Shears—Seymour's.....dis 50%
Tools—Tinmen's.....
Traps, Steel—Newhouse.....dis 17½%
Tacks—Half Weight Am. Iron.....dis 70 @ 70&7½%
Vises—Parallel, Buffalo.....dis 15%
Wrenches—Coes' genuine.....dis 25%
Coes' Imitation.....dis 45 & 10%
Tafts' Pattern.....dis 62½&10%
Ware—French, Tinned and Iron.....dis 20%
Stamped and Japanned.....net
Cast Iron Hollow.....dis 20@30%

METALS.

Tin Plates, Charcoal IC.

10x14	$13 25
12x12	13 75
12½x17	12 75
14x20	14 25
14x20 terne	12 00
20x28 "	27 00
Add for each X	2 50
Pig Tin—Straits	40 @ 41c
Banca	47 @ 48c
Solder.....No. 1 No. 2	50 lbs. deduct ½c
24c 22c	100 " " 1c
Sheet Zinc, "Lasalle," 1000 500	100 lb casks
$10 75 $10 85	$11 05 ₽ 100 lbs
Iron Wire—Bright and annealed	dis 10 @ 20%
Coppered	dis 5 @ 15%
Tinned	dis 5 @ 15%
Tinned Broom Nos. 20 to 22	₽ lb 16½c
Copper—Sheathing 14@18 oz	₽ lb 43c
Planished	₽ lb 49 @ 51c
Bottoms	₽ lb 45c
Bolts	₽ lb 45c
Braziers' Sheets	₽ lb 45c

Sheet Iron—W. D. Wood & Co.'s Smooth Char.			Jun
Nos. 10 to 14	6·45	7·95	9·65c
Nos. 15 to 20	6·95	8·35	9·85c
Nos. 21 to 24	7·15	8·55	10·05c
Nos. 25 & 26	7·35	8·75	10·25c
No. 27	7·55	8·95	10·45c
Am. Russia	A.	B.	
	14½c	12½c	

Gen. Russia, No. 1 stained.....19c
" " clean.....20c
Galvanized.....dis 20%

CHICAGO.

Reported by Markley, Alling & Co., Dec. 1872.

AUGERS AND BITS.

Ives', extra C. S.....dis 20%
Jenning's.....net list
Cooks'.....dis 25%
Snell's.....dis 7½%
Snell's Car Bits.....net list

AXES.

Amoskeag Yankee.....₽ doz $13 50
" Crescent.....14 00
Hunt's Yankee.....14 50
Kennebeck Yankee.....12 00
Lippincott " 12 50
" Crown.....13 00
" Beveled.....13 00
Jefford's Silver Steel.....13 00
Red Warrior, Beveled.....14 00
Kennebeck, Handled.....15 00
Boy's, Handled.....12 00

BOLTS.

Carriage and Tire.....dis 50&20%
Cast Barrel and Shutter.....dis 20&10%
Wrought Iron Barrel.....add 10%
" " Square.....net list

BUTTS.

Cast Fast Joint, Narrow.....dis 10%
" " Broad.....dis 20%
" Loose Joint.....dis 35%
" " Pin, Reversible.....dis 25%
" " Japanned.....dis 25%
" " Silver Tipped.....dis 25%
Wrought Narrow, Fast Joint.....net list
" Broad, Fast Joint.....dis 15%
" " Loose Joint.....dis 15%
" Loose Pin.....dis 15%
" Table.....net list
" Brass.....dis 15%
Garretson's Blind Butts, Wood.....doz sets $2 00
" " " Brick.....doz sets 3 00
Parker's " " Wood.....doz sets 2 25
" " " Brick.....doz sets 3 25

CASTERS.

Iron Plate.....dis 20%
Brass Wheel Plate.....dis 20%
Porcelain Wheel Plate.....dis 20%
" " Bed.....dis 20%
Iron Wheel Bed.....dis 20%

CHISELS.

Butcher's Tanged Firmer.....dis 30%
Long Paring.....dis 30%
Witherby Socket Framing.....dis 50&15%
" " Firmer.....dis 50&15%
" " Corner.....dis 50&15%
" " Slicks.....dis 50&15%

COFFEE MILLS.

Box 4 Iron.....$ 3 75
" 103 " 5 25
" 102 " 7 50
" 107 Britannia.....7 50
" 106 " 9 25
" 25 Union.....11 00
" 35 " 13 00
" 75 Cast Steel.....11 00
" 85 " 13 00
Side 50.....4 75
" 60.....5 75
" 70.....7 25
" 90.....18 00
" 15 Union.....7 00
" 20 " 8 00

CUTLERY.

American Table.....dis 20%
" Pocket.....dis 25%

DOOR SPRINGS.

Torry.....₽ doz $7 50
Rubber....." 4 00
Boon's....." 5 00

DRAWING KNIVES.

Witherby Tool Co.....dis 50&15%
Ohio Tool Co.....net list

FILES.

Butcher's.....$7 00 £
Nicholson's.....$5 00 @ $5 50 £

HAMMERS.

Maydole's.....net list
Yerks & Plumb.....net list
Chency.....net list

HANDLES.

Extra Axe.....₽ doz $3 00
No. 1 Axe....." 2 25
No. 2 Axe....." 2 00
R. R. Pick, No. 1....." 2 00
Coal " " ....." 2 00
Sledge, No. 1....." 2 00
Hatchet....." 65
Hammer, A, E....." 65

HATCHES.

Amoskeag Shingling, No. 1.....₽ doz $7 25
" No. 2....." 8 00
" No. 3....." 8 75
" Claw, No. 1....." 7 75
" " No. 2....." 8 50
" " No. 3....." 9 25
" Lath, No. 1....." 7 50
" " No. 2....." 8 25
" " Solid Steel....." 12 00

HINGES.

Strap and T.....dis 5%
Screw Hook and Strap, 8 to 12 in.....net, 10c ₽ lb
" " 14 to 24 in.....net, 9c ₽ lb
Hook and Eye Hinges.....net 12c @ 16c ₽ lb
Gate, No. 35, State.....₽ doz $3 5
" No. 3, In and Out....." 3 50
" Blinn's Pat....." 7 50

HORSE NAILS.

Northwestern, 8d.....24c
Ausable, 8d.....24

KETTLES.

Brass.....net 5 5
Enameled.....dis 15%

LOCKS AND KNOBS.

Norwalk Lock Co.....dis 20%
Branford " .....dis 20%
Eagle " .....dis 15%
American Pad Locks.....dis 25%
Continental Lock Co.....dis 10%

MEAT CUTTERS.

Haven's Patent.....net lis
Hale's " .....dis 10%
Woodruff " .....net list
Stowe's Sausage Stuffers.....net list

MOLASSES GATES.

Stebbin's Patent.....dis 40%
Enterprise " .....dis 5%

OIL STONES.

Washita No. 1.....net 35c ₽ lb
" Slips.....net 65c
Hindostan No. 1.....net 9c
" Axe.....net 6c
" Slips.....net 15c

PICKS AND MATTOCKS.

Picks, Railroad, Axe Finish.....₽ doz, $13 00
" Coal, Axe Finish....." 10 00
Mattocks, L. C., Axe Finish....." 16 00
" S. C., " ....." 15 50
Grub Hoes, Axe Finish, No. 2....." 12 00

PLANES.

Ohio Tool Co. Bench.....dis 10%
Sciota.....dis 15%
A. Howland & Co. Bench.....dis 10%
" " Fancy.....dis 10%
Bailey Patent Iron.....dis 15%
Plane Irons, Butcher's.....dis 10%

RIVETS.

Iron.....dis 10 @ 15%
Tinned.....dis 10 @ 15%
Copper, No. 7.....net, ₽ lb, 60c

RULES.

Stanley Rule and Level Co.....dis 30%
Hubbard & Curtiss Mfg. Co.....dis 30%

SAD IRONS.

Best A No. 1.....₽ lb, net, 5½c
" Copper Face Star.....6c

SANDPAPER.

Wiggin & Stevens, No. 0 to 1½.....₽ ream, net, $4 50
" " No. 2 to 3....." " 5 00

SASH LOCKS.

Champion.....₽ gross, net, $12 00
Hopkins & Dickinson.....dis. 10%
Judd's Patent.....dis. 10%
Corbin's Patent.....dis. 10%
Clark's " .....dis. 20%

SAWS.

H. Disston & Sons.....dis 5%
Champion X Cut.....₽ foot, net, 60c
M. A. & Co. X Cut....." " 50c

SCREWS.

American Screw Co.—Iron.....dis 45&5%
" " —Brass.....dis 25%
" " —Blued Rd. Head.....dis 25%

SHOVELS AND SPADES.

Ames' Black Shovels.....₽ doz, $15 00
" Polished " ....." 16 00
" Patent " ....." 18 00
Alling " " Molders'....." 15 00
Crane's Black " ....." 18 00
" Polished " ....." 12 00
Smith's " B. S. L. H. Rd. Pt. " 13 00
" " B. S. D. H. Rd. Pt. " 13 50
Ames' Black Spades....." 14 00
" Polished " ....." 16 50
" Patent " ....." 17 50
Alling " " ....." 18 00
Crane's Black " 15 50
" Polish'd " 12 50
.....13 50

SCOOPS.

Alling Steel Polished, No. 2.....₽ doz, $14 00
" " No. 3....." 14 50
" " No. 4....." 15 00
" " No. 5....." 16 00
" " No. 6....." 17 00
" " No. 7....." 18 00
" " No. 8....." 19 00
" " No. 10....." 22 00
Crane's Polished, No. 5....." 14 00
" " No. 6....." 15 00
" " No. 7....." 16 00
" " No. 8....." 17 00
Crane's Black Coal, No. 4....." 18 00
" " No. 5....." 18 50
Preston, Black Scoops No. 1.....₽ doz $12 00
" " " 2....." 12 50
" " " 3....." 13 00

Steel.

THREE 1st CLASS PRIZE MEDALS. CLASSES 1, 21, 22. Great Exhibition of Industry, LONDON, 1851.

MEDAL OF HONOUR, SOCIETY OF ARTS & INDUSTRY, LONDON, 1856.

1st CLASS PRIZE MEDAL, CLASS 1st UNIVERSAL EXHIBITION OF INDUSTRY PARIS, 1855.

COCKER BROTHERS,

SUCCESSORS TO

SAML. COCKER & SON,

(Established 1752.)

SHEFFIELD. ENGLAND.

MANUFACTURERS OF

CAST, SHEAR, SHEET, AND BLISTER STEEL, OF EVERY DESCRIPTION.
BEST CAST STEEL WIRE, ADAPTED SPECIALLY FOR MECHANICAL PURPOSES;
Also for ROPES, NEEDLES, FISH HOOKS, PINS, CRINOLINE, &c.

BEST CAST STEEL FILES, SAWS, EDGE TOOLS,
HACKLES, GILLS, CARD CLOTHING, CARD TEETH, HACKLE AND GILL PINS,
FISH HOOKS, NEEDLES, &c.

ALSO

GENERAL MERCHANTS.

Agent, **JONATHAN HATTERSLEY, Cincinnati, Ohio**

WM. JESSOP & SONS,

MANUFACTURERS OF

STEEL,

AND IMPORTERS OF IRON,

SHEFFIELD, ENGLAND.

PRINCIPAL DEPOTS:

NEW YORK, Nos. 91 and 93 John Street.....BOSTON, Nos. 133 and 135 Federal Street.

AGENCIES:

PHILADELPHIA, Jas. C. Hand & Co .....PROVIDENCE, Cornett, Nightingale & Co.
CHICAGO, Crerar, Adams & Co.....ST LOUIS, Henry Bakewell & Sons.
CINCINNATI, Augustus Wessel.....NEW ORLEANS, Folger & Co.
SAN FRANCISCO, Russell & Erwin Manufacturing Co.

F. W. MOSS,

Successor to **JOSHUA MOSS & GAMBLE BROTHERS.**

MANUFACTURER AND IMPORTER OF

STEEL AND FILES.

Principal Depots: 80 John Street, New York, and 512 Commerce Street, Philadephia

MOSS & GAMBLE **SUPERIOR C. S. "FULL WEIGHT" FILES,**

" Cast Steel Hammers and Sledges. Also, "M. & G." Anvils and Vises.

" **WARRANTED CAST STEEL,** especially adapted for DIES and TURNING TOOLS, DRILLS, COLD CHISELS, PUNCHES, and all kinds of MACHINISTS' TOOLS.

" Celebrated Improved Mild Centre Cast Steel, for Taps, Reamers, and Milling Tools, warranted not to crack in hardening Taps of any size.

" Swede Spring Steel, especially adapted to Locomotive and Railway Car Springs.

" English Spring and Plow Plate Steel.

Also, manufacturer of

Sheet Cast Steel, Shear, German, Round Machinery, Hammer, Fork and Shovel Steel

And GENERAL MERCHANT.

A. M. F. WATSON, General Agent.

WILSON HAWKSWORTH, ELLISON & CO.,

MANUFACTURERS OF

STEEL, STEEL WIRE, &C.,

AND GENERAL MERCHANTS,

CARLISLE WORKS, SHEFFIELD, ENGLAND.

AGENCIES:

New York, 72 John Street.
Philadelphia, 505 Commerce Street.
Boston, 6 and 8 Liberty Square.

BARROW HÆMATITE STEEL COMPANY

LIMITED.

BARROW IN FURNESS,

LANCASHIRE, England

MANUFACTURERS OF

STEEL RAILS, TYRES, WHEELS,

Axles. Shafting, Boiler and Ship Plates, Bessemer Pig Iron, &c., &c.

CHAS. CONGREVE & SON,

SOLE AGENTS FOR THE U. S.,

104 and 106 John Street, opposite Cliff Street, NEW YORK.

J. & RILEY CARR,

MANUFACTURERS OF SUPERIOR

STEEL

For Tools, Cutlery, Saws, Files, Augers, Gimblets, &c.; Sheet Cast Steel for SPRINGS AND STAMPING COLD;

ALSO THE CELEBRATED

DOG BRAND FILES,

Unsurpassed, if equaled, in quality.

Bailey Lane Works, Sheffield, England,

Warehouse, 82 John St., New York.

Established 1810.

HENRY MOORE, Attorney.

Steel.

SANDERSON BROTHERS & COMPANY,

(LIMITED)

MANUFACTURERS OF THE

CELEBRATED CAST STEEL,

WARRANTED MOST SUPERIOR FOR TOOLS.

DARNALL WORKS,
ATTERCLIFFE FORGE,
WEST STREET WORKS, } SHEFFIELD, ENGLAND.

IMPORTERS OF FILES,

AND

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Sole Manufact'rs of **"CHOICE"** Extra Cast Steel.

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In calling the attention of consumers of Steel in any of the varieties above enumerated, we would respectfully assure them of our ability to supply an article that cannot be excelled in quality, temper, and adaptation in all respects to the various purposes for which it may be required. Half a century of practical experience in all departments of Steel manufacture, a long established reputation in England, and the Continent of Europe, and in the Eastern States principally of this Country, encourage us to solicit a universal trial of our Steel for the above or other purposes for which a first class material in quality, temper, and durability is needed.

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Particular attention is paid to quality and temper for

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Hot and Cold Rolled Sheets for Clock Springs, Corset Clasps, Pens, &c.

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OF ALL KINDS AND SIZES. BEVELED, BOLTED, FINISHED AND TEMPERED TO SUIT ALL KINDS OF SOIL.

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With the exception of our Horse Hay Fork and Fixtures we make no complete Implement. Agricultural Steels and Irons we make a specialty. From the universal approval our goods have secured by actual test in the hands of Implement Makers and Farmers from the Atlantic to the Pacific, and with our facilities, experience and improvements, we frankly assure the Trade of our ability to meet the requirements of the age. All of our Steel Goods have imprint of our Trade Mark.

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Supersedes Weights and Boxes.

Is a perfectly even Balance at all points. Is **Neat, Simple, Durable** and **Cheap.** Can be placed in any window at any time. Is noiseless and obeys the slightest touch. Is easily applied and will not get out of order. Facilitates cleaning of windows. Recommends itself.

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Manufacturers of **Extra Quality Tool**

CAST STEEL,

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SAW PLATES,

All descriptions of **Cast and German**

Spring and Plow Steel

Elliptic and Side Springs, Sent Springs,

AXLES, STEEL TIRE,

Plow Wings, Shares, Cultivators, Reaper Bars, Crow Bars, &c., &c.

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Minerva Iron & Steel Works,

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MANUFACTURER OF

"Jenks' Spring Steel," and Cast Spring Steel,

Also, TIRE, TOE CORK, SLEIGH SHOE, BLISTER AND PLOW STEEL.

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SOLE AGENTS,

43 Chambers St., New York.

A full assortment of "Jenks' Spring Steel," in stock.

MILLER, BARR & PARKIN,

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Manufacturers of all descriptions of

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Gunpowder.

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Sporting, Shipping, and Mining

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DUPONT'S GUNPOWDER MILLS,

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Have maintained their great reputation for 70 years. Manufacture the

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Also, SPORTING, MINING SHIPPING, AND BLASTING POWDER

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LAFLIN & RAND POWDER CO.,

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SAFETY-FUSE at wholesale.

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MANUFACTURERS OF ALL DESCRIPTIONS OF

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INCLUDING

Best Refined Steel for Edge Tools.

PARTICULAR ATTENTION PAID TO THE MANUFACTURE OF STEEL FOR

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Smoke-Stack Steel, Cast Steel Forgings for Crank Pins, Car Axles, &c.

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"Hussey, Wells & Co. Cast Spring Steel,"

For Elliptic Springs for Railroad Cars & Locomotives.

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ESTABLISHED IN 1845.

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Cast and German Plow and Spring Steel,

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PLATES AND STEEL FORGINGS OF ALL DESCRIPTIONS.

New Jersey Steel and Iron Company.

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MAKERS OF

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Channel Bars, the Trenton Steel Top Rails, &c., &c. Refined Iron, Brazier and Wire Rods.

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For Machinery Uses and Fire-Box Plates.

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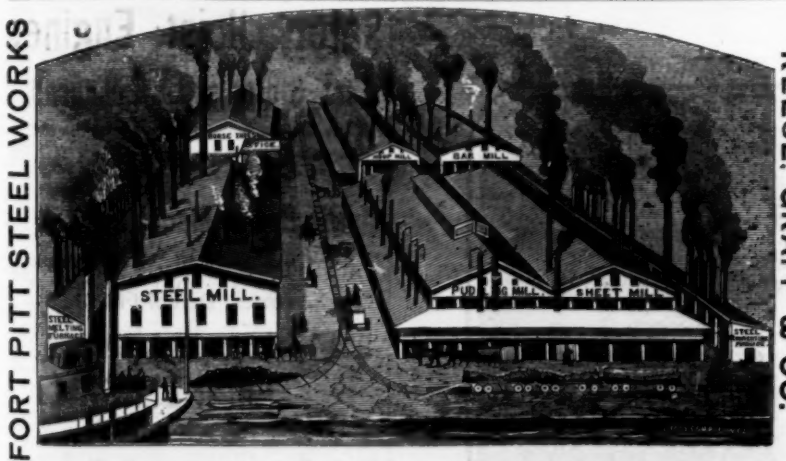

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CHICAGO, Dec. 2, 1872.

TIN PLATE.

IC, 10x14, Coke	$13 00
IC, 10x14, Charcoal	14 00
IX, 10x14 "	17 00
IC, 12x12, Coke	
IC, 12x12, Charcoal	14 50
IX, 12x12, "	17 50
IC, 14x20, Coke	
IC, 14x20, Charcoal	15 00
IX, 14x20, "	18 00
IXX, 14x20, "	21 00
IXXX, 14x20, "	24 00
IXXXX, 14x20 "	27 00
IX, Taggal, "	28 50
DC, 100 Plate, "	14 00
DX "	17 00
DXX, "	20 00
DXXX, "	23 00
IC, 14x20, Coke Roofing	13 50
IC, 14x20, Charcoal Roofing	16 00
IX, 14x20, "	29 00
IC, 20x28, "	29 00
IX, 20x28, "	34 00

PIG TIN.

Large, 60 lb	40c
Small, 30 lb	41c
Bar Tin	42c

ZINC.

In casks 1000 lbs	10¾c
" 500 "	10¾c
In sheets	11c
Slab	9c

COPPER.

Copper Bottoms	48c
Sheathing Copper	43c
Planished Copper 14x48	51c
Size, 14x52, 14x56, 14x60 Nos. 7 8 9 Planished Copper	53c

BRAZIERS' SHEETS, 30x60.

6 to 8 lbs	53c
10 and 12 lbs	50c
13 to 100 lbs	47c
Ingot Copper	
Bolt Copper	50c

SOLDER.

Fine, C. B. & Co.'s Brand	25c
Ordinary	23c
Plumbers' Solder, No. 1	23c
" " 2	21c
ANTIMONY	
BABBIT METAL	15c to 25c
GALVANIZED IRON Conductor Pipe, per lb	12c

SHEET IRON.

	Common.	Smooth.	Charcoal.
No. 14 to 24	7¼c	8c	9¼c
25 & 26	7½c	8¾c	9¾c
27	7¾c	8¾c	10c

Add ¼c per lb for 30 in. wide.

GALVANIZED IRON.

No. 16 to 20	15c
" 21 to 24	16c
" 25 & 26	17c
" 27	18c
" 28	20c

Discount, 20 per cent.

RUSSIA IRON.

Perfect, all numbers	20c

In sheets, 1c. higher.

AMERICAN RUSSIA.

A	
B	

In sheets, 1c. higher.

BRAZIERS RODS.

¼ inch, 10 ft. long, per lb	8c
3-16 " " " "	10c

LEAD.

Pig	9c
Bar	10c
Lead Pipe, in full coils	11c
" " when cut	11½c
Sheet Lead	11c

CINCINNATI.

Reported by Sellew & Co., Importers and Jobbers of Metals, No. 214, 216 and 218 Main street.

TIN PLATE.

I. C. 10x14 Charcoal	$14·00 @ 15·00
I. C. 10x14 best Coke	13·50 @ 14·50
I. C. Terne, 14-20	12·00 @ 13·50
I. C. " 20-28	28·00 @ 29·00
I. C. Continuous	27·00

METALS.

Pig Tin, Banca	none in town
" Straits	40c
" English	41c

SOLDER.

S. & Co.	₩ lb 27c
A 1	" 25c
Roofing	" 24c

LEAD.

Pig	₩ lb 7½c @ 8c
Bar	" 8½c @ 9c

COPPER.

Ingot	none in town
Planished	₩ lb 51c @ 54c
Sheathing	" 46c @ 48c
Bolt	" 45c
Brazier, 6 to 9 lb	" 51c
" 10 to 14 lb	" 48c
" 14 to 100 lb	" 45c
Copper Bottoms	" 48c

ZINC.

Cask, 500 to 1000 lbs	₩ lb 11¼c @ 11¾c
Case, 100 lbs	" 11½c @ 12 c
Slab	" 7¾c @ 9 c

BRASS.

Roll, No. 6 to 30	₩ lb 45c
" " 30 to 38	" 50c
" " 38 to 40	" 65c
Wire " 0 to 20	" 50c
" " 20 to 25	" 60c

BABBIT METAL.

Sellew & Co	₩ lb 35c
Black Lead	" 25c
Market	" 15c

ANTIMONY.

₩ lb	22c

BISMUTH.

₩ lb	$6 00

NICKEL.

₩ lb	$3 50

PIG IRON.

Hot Blast Charcoal.—	
Hanging Rock No. 1	$55 00 @ 56 00
" " No. 2	53 00 @ 54 00
" " Forge	45 00 @ 46 00
Tennessee No. 1	54 00 @ 55 00
" Forge	44 00 @ 45 00
Alabama No. 1	55 00 @ 56 00
Missouri No. 1	55 00 @ 56 00
" No. 2	53 00 @ 54 00
Stonecoal Pig.—	
Missouri No. 1	55 00 @ 56 00
" Forge	43 00 @ 44 00
Ohio No. 1	54 00 @ 55 00
" Forge	40 00 @ 42 00
Scotch Pig No 1	none in town
Cold Blast Charcoal.—	
Hanging Rock Car Wheel	60 00 @ 65 00
Missouri Car Wheel	60 00 @ 62 00
Red River Car Wheel	60 00 @
Tennessee "	60 00 @ 62 00
Alabama "	60 00 @ 62 00

SHEET IRON.

Russia	₩ lb, 19 @ 23c
Am. Russia A	" 14 @ 15c
" " B	" 13 @ 14c

	Com. B.	Smooth Fin. S. L. U.	Smooth D. Re'fd.
18 to 20	6·3c	7·5c	8·5c
22 to 24	6·5c	7·8c	9·0c
26	6·8c	8·0c	9·2c
27	7·0c	8·2c	9·4c
30	8·2c		

GALVANIZED IRON.

Nos. 18 to 20	15c
" 22 to 24	16c
" 25 to 26	17c
No. 27	18c
" 28	20c

Galvanized, 15 @ 20 ₰ discount in full bundles.
Bar Steel, Silver, ₩ lb 22c; Crescent, 17½ @ 18c.
Iron Wire, discount, 10 @ 15 ₰.
Enameled Ware, discount, 15 @ 20 ₰.

ONE PIECE CORRUGATED ELBOWS.

Charcoal Iron.		Russia Iron.	
4½ inch	₩ doz $3.75	4½ Inch	₩ doz $8.00
5 "	" 4·25	5 "	" 10·00
5½ "	" 5·25	5½ "	" 13·00
6 "	" 5·25	6 "	" 13·00
7 "	" 6·50	7 "	" 14·00

LEADER ELBOWS—FLAT CRIMP RETINNED.

	per doz.		per doz.
2-inch	$2 00	2½-inch	$2 25
3-inch	2 50	3½-inch	3 00
4-inch	3 50	4½-inch	4 00

Sheet Iron Bread Pans ₩ lb 12½ @ 13c.
American Broilers, ₩ doz, $12 @ $15.
Tinmen's Machines, net list, add 5 ₰.
Sad Irons, ₩ lb., 5½c. @ 5¾c.
Brass Kettles, Ansonia, 53 @ 54c: L. & G., 50c.

Inside Diameter. Inches.	Wrought Iron Pipe. Per Foot.	Weights of Pipe. Per Foot.
⅛	$ 12	24
¼	12	42
⅜	14	56
½	15	85
¾	25	1·12
1	34	1·67
1¼	48	2 25
1½	60	2·69
2	85	3 66
2½	1·25	5·77
3	1·75	7·54
3½	2 10	9 05
4	2·75	0·72

45 ₰ discount.

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Corrected weekly by Semple, Birge & Co.

ANVILS.

Armitage	₩ lb, gold, 13c
Peter Wright's	" " 13½c
Wilkinson's	" " 12½c

APPLE PARERS.

Conqueror	₩ doz $8 50
Lightning	" 8 50
Turn Table	" 8 50

AUGERS AND BITTS.

Cook's	25 ₰ off list
Ives'	30 ₰ "
Jennings'	5 ₰ "
Snell's	10 ₰ "

AXES.

Hunt's	₩ doz $14 00 @ 15 00
Lippincott's	" 13 50 @ 14 50
Lippincott's Pioneer	" 14 00 @ 15 00
Simmons'	" 13 50 @ 14 50

AXLES.

Kritch & Crane Mfg. Co.'s—	
Patent Taper Axles	5 ₰ off list
Swelled Taper Axles	5 ₰ "
Concord Axles	5 ₰ "
Red Jacket Axles	5 ₰ "
Common Axles, 1¼ inch and upward	₩ lb 9c
" " less than 1¼ inch	" 9½c

BELLS.

Troy, Church	₩ lb 55c
Light Brass, Hand	50 ₰ off list
Moore's, Cow	20 ₰ "

BOLTS.

Arms, Bell & Co.'s Machine	10 ₰ off list
" " " Carriage and Tire	60 ₰ "
Norway Iron Carriage and Tire	45 ₰ "
Cast Iron Barrel, Shutter, &c	30 ₰ "

CAST BUTT HINGES.

Narrow Fast Joint	15 ₰ off list
Broad Fast Joint	50 ₰ "
Broad Loose Joint	40 ₰ "
Reversible	30 ₰ "
Revers. Japanned and Silver Tipped	30 ₰ "
Loose Joint " "	20 ₰ "
Excelsior Reversible Blind	25&5 ₰ "
Lull & Porter's Blind	25&5 ₰ "

WROUGHT BUTTS.

Narrow	net list
Reversible	15 ₰ off list
Broad	15 ₰ "
Table Hinges	net list
Back Flaps	net list
Inside Blind Hinges	net list

CASTERS.

Porcelain Wheel Bed or Plate	revised list 30 ₰ off
Iron or Brass " "	

CHAINS.

English Coil	3-16	¼	5-16	⅜	7-16	½ in.
	15	12½	11¼	11	10½	10c. gold
Trace				6½-10-2		75c. "
				7-10-2		80c. "

German Coil and Halter new list add 25 ₰ "

CHISELS.

Socket, Firmer or Framing	55 ₰ off list

CLOTHES WRINGERS.

Colby's	₩ doz $66 00
Novelty	" 72 00
Universal	" 72 00
Monitor	" 72 00

COFFEE MILLS.

Parker's	net list
P. S. W. & Co.'s	5 ₰ off list

CORN KNIVES.

Dunn Edge Tool Co.'s Clipper	₩ doz $5 75
Disston's	" 5 75

CROW BARS.

Steel Pointed	₩ lb 8 @ 10c
Solid Cast Steel	" 20c

CUTLERY.

J. Russell & Co.'s	15 ₰ off new list
Lamson, Goodnow & Co.'s	
Landers, Frary & Clark's	

FILES AND RASPS.

Nicholson's Mill Files	$5 50 to the £ currency
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Butcher's Files	7 00 to the £ currency
Heller's Horse Rasps	$10 00 to the £ cur'y less 40 ₰

FORKS AND HOES.

Auburn Mfg. Co.'s Hay & Manure Forks	25 ₰ off list
" " " Handled Hoes	20 ₰ "
" " " Planter Eye Hoes	add 15 ₰ to list
Winsted's Planter Eye Hoes	add 15 ₰ "

HAMMERS.

Yerkes & Plumb	new list net
Masons' Hammers	₩ lb 20c
Smith Hand Hammers	" 22c

HANDLES.

	Extra.	No. 1.	No. 2.	No. 3.
Axe	$2·75	$2·25	$1·75	$1·00
Pick	Extra. $2·50	No. 1. $2·00	No. 1½. $1·75	No. 2. $1·25

Smith & Montross Fork, Hoe and Rake 10 ₰ off list
" " Broom and Mop $12 @ $18 ₩ M.

HARROW TEETH.

1 inch iron	₩ lb 6c
¾ and ⅞ inch, iron	" 6c
⅝ inch iron	" 6¾c
Barbed or Headed	¾c extra

HATCHETS.

Hunt's	add 5 ₰ to list
Simmons'	5 ₰ off list

HAY KNIVES.

Lightning	₩ doz, $24 00
Dunn Edge Tool Co.'s	₩ doz $14 50—less 10 ₰
Fisher's	" 16 50—less 10 ₰

HINGES.

Strap and T—St. Louis make	net list

HORSE NAILS.

Eureka	23c rates
Ausable	22c "
Northwestern	22c "
Eagle	19c "
Globe	25c "

HORSE SHOES.

Rhode Island (Perkin's pattern)	₩ keg $7 50
Burden's	" 7 50
Mule Shoes	$1 00 extra
Rhode Island Trotting Shoes	₩ 50 "

LOCKS AND LATCHES.

Jones & Nimick's	20 ₰ off list.
Moorehead, Adams & Co	20 ₰ "
Norwalk Lock Co.'s revised list	40 ₰ "

MATTOCKS AND GRUB HOES.

Klein, Logan & Co.'s Mat'cks	₩ doz. $14 25 @ 15 75
" Grub Hoes, Oval Eye	₩ doz. $11 00 @ 12 50

NAILS.

Wheeling	$5 60 rates.

PICKS.

Klein, Logan & Co.'s R. R. and Clay	$12 00 ₩ doz.
" " Coal	9 75 "
" " Poll	7 00 "
" " Stone	16 50 "
" " Tamping	19 00 "

PLANES.

Ohio Tool Co.'s	net list
Eastern	5 ₰ off list

SAD IRONS.

Monitor Brand, Silver Polished	₩ lb 6c

SASH WEIGHTS.

Standard Solid Eyes	₩ lb 3½c

SAWS.

Disston's	5 ₰ off list
Spear & Jackson's	$5 00 to £ gold
Hubbard, Lippincott, B. & Co.'s	10 ₰ off list
Branch, Crooks & Co.'s	10 ₰ "
Livingston's Patent Buck	net list

SCREWS.

American Screw Co.'s revised list	45 ₰ off
$2000 worth in 6 months	2½ ₰ extra

SCYTHES.

Blood's C. S. & G. S.	net list
Dunn's Edge Tool Co.'s	"
Paris Furnace Co's	20 ₰ off list
Waldron's English	$9 00 to £

SCYTHE STONES.

No. 1 Indian Pond	₩ gross	$ 7 0
Extra Indian Pond	"	7 50
Premium	"	9 50
Diamond Grit	"	13 50

.25 ₰ off

SHOVELS, SPADES AND SCOOPS.

Ames'	add $1 00 to list
Lippincott's	new list net
Rowland's	net list

SLEDGES.

Smith Stone or Coal Sledges—	
Steel Face Polished	₩ lb 17c
Solid Cast Steel	" 35c
Striking Sledges	₩ lb extra 1c

SNATHS AND CRADLES

	20 ₰ off list

SPRINGS.

Cleveland Spring Co.'s—	
Carriage and Express	net list
Blue Seat Springs	20 ₰ off list

TACKS.

Norway Tack Co.'s ½ weight	70 ₰ off list
Brads	50 ₰ "

TRAPS.

Newhouse Patent	12½ ₰ off list.
Reichard's Animal, Wood Bottom	₩ doz $10 00
" Metal Bottom	" 12 00

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Solid Box	₩ lb 18c
Wilson Mfg. Co.'s	15 ₰ off list

WRENCHES.

Coes' Genuine	25 ₰ off list
Coes' Pattern	40 ₰ "
Taft's	50 ₰ "

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We have made arrangements to furnish Kocu's PATENT BINDER, which we think altogether the best before the public, to our subscribers at the following very low rates—about the wholesale prices by the dozen.

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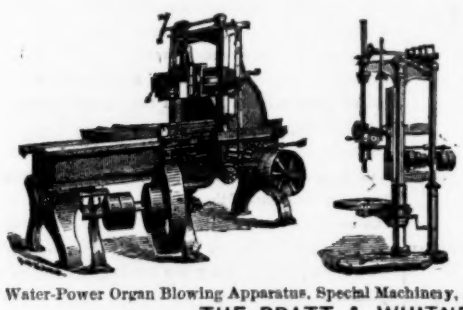

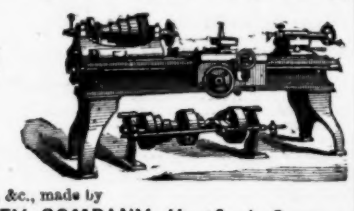

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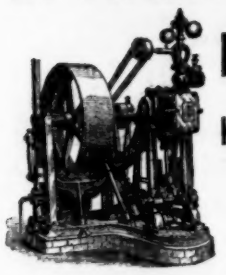

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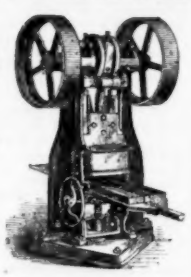

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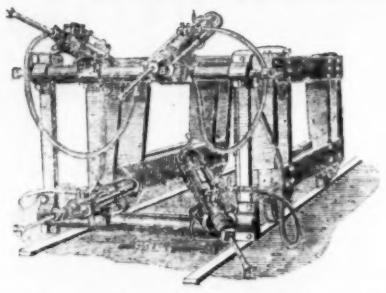

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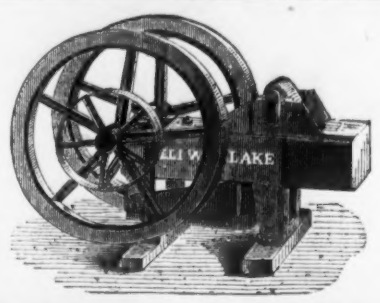

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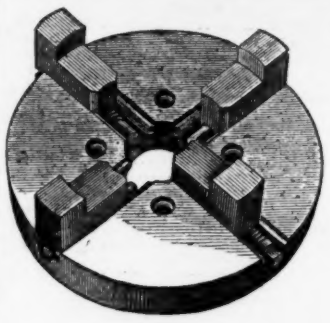

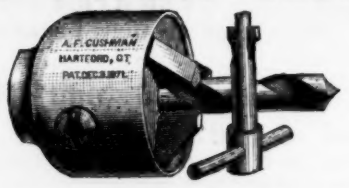

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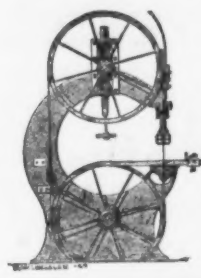

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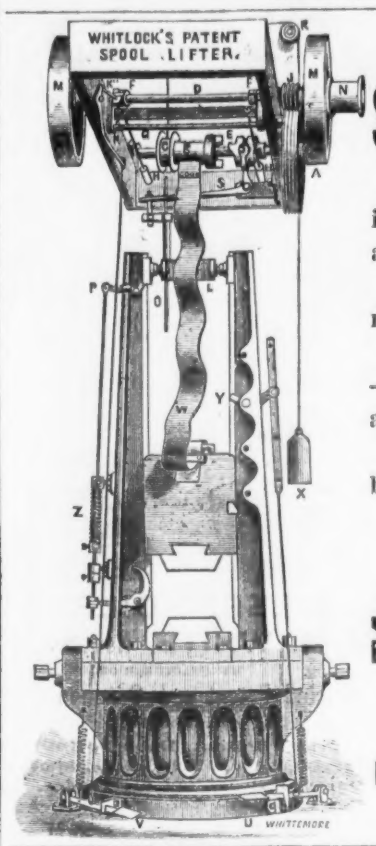

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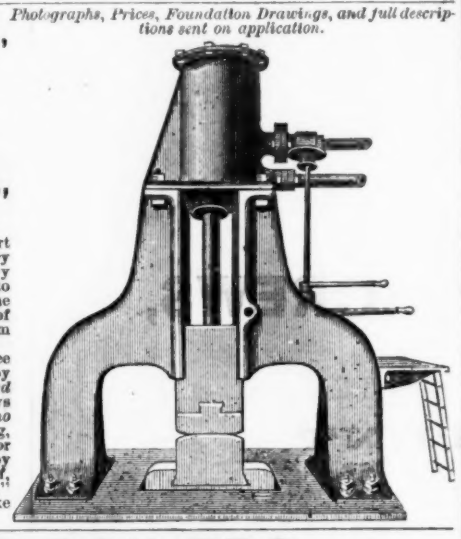

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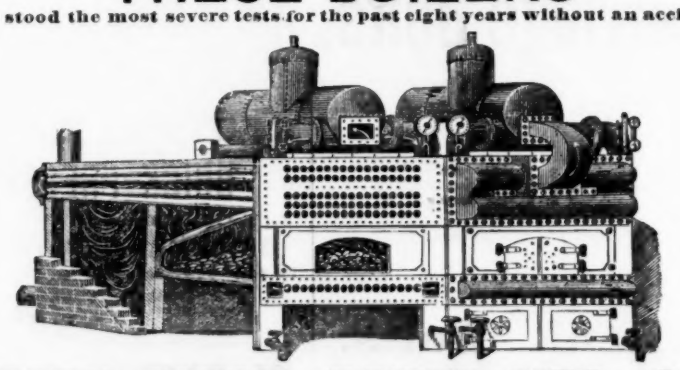

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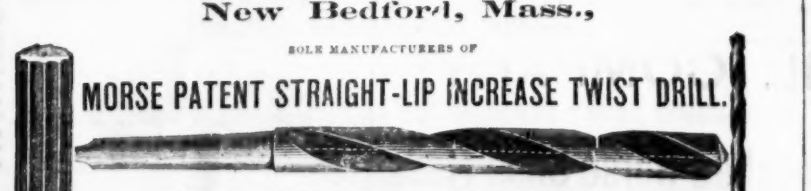

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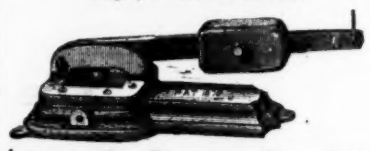

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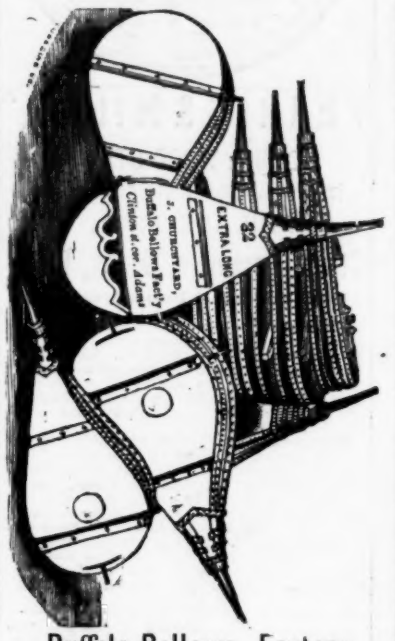

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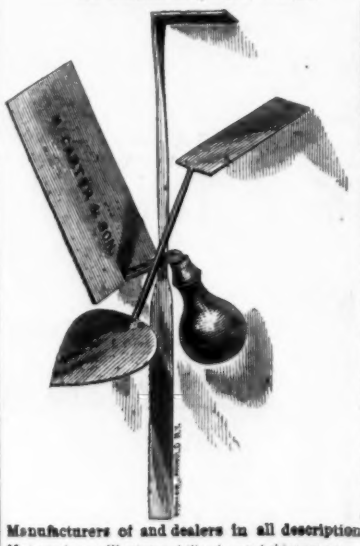

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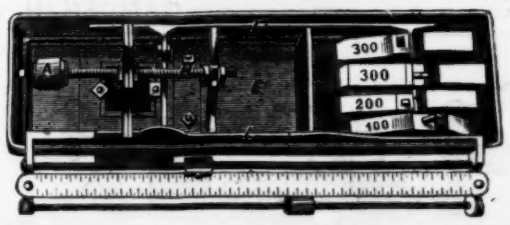

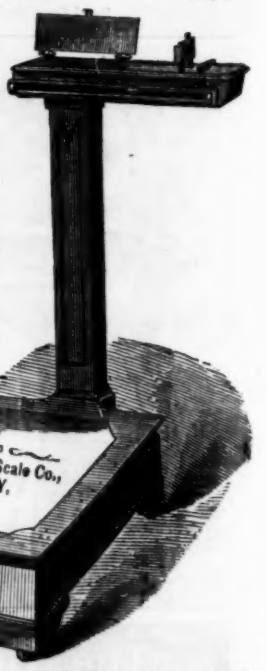

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2d. More durable because there is less friction.
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